GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED MARINERS OUTLOOK – PHASE I
APNS: 03-30-27-239050, -249080, -210180, -210140, -210130, -210050, AND -210125
SEQUIM, WASHINGTON

PROJECT NO.102-21014
JULY 26, 2021

Prepared for:

MARINERS INVESTORS
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BOULDER, CO 80301

Prepared by:

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CONSTRUCTION TESTING & INSPECTION

July 26, 2021 KA Project No. 102-21014

Mariners Investors, LTD
6676 Gunpark Drive, Ste. D
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301 E 6th St.
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Attn: Mr. Tracy Gudgel
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Reference: **Geotechnical Engineering Investigation**
Proposed Mariners Outlook – Phase III
Assessor Parcel Numbers (APNs): 03-30-27-239050, -249081, -210180, -210140, -210130, -210050, and -210125
Sequim, WA

Dear Mr. Gudgel,

In accordance with your request, we have completed a Geotechnical Engineering Investigation for the referenced site. The results of our investigation are presented in the attached report.

If you have any questions, or if we can be of further assistance, please do not hesitate to contact our office.

Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

Vijay Chaudhary, P.E.
Project Engineer

EB:VC:MDR

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SEQUIM, WASHINGTON

INTRODUCTION

This report presents the results of our geotechnical engineering investigation for the proposed Mariners Outlook – Phase III project located on the above referenced parcels in Sequim, Washington, as shown on the Vicinity Map in Figure 1. Discussions regarding site conditions are presented in this report, together with conclusions and recommendations pertaining to site preparation, excavations, structural fill, utility trench backfill, foundations, pavement design, stormwater infiltration, drainage, and erosion control.

Site plans showing the approximate test pit locations are presented following the text of this report in Figures 2A and 2B. A description of the field investigation, summary of test pit logs, and the test pit log legend are presented in Appendix A along with the laboratory testing results. Appendix B contains a guide to earthwork specifications. Pavement design guidelines are presented in Appendix C. The recommendations in the main text of the report have precedence over the more general specifications in the appendices.

PURPOSE AND SCOPE

This investigation was conducted to evaluate the subsurface soil and groundwater conditions at the subject property, to develop geotechnical engineering recommendations for use in the design of specific construction elements, and to provide criteria for site preparation and earthwork construction.

Our scope of services was performed in general accordance with our revised proposal for this project, dated March 1, 2021 (Proposal Number G21017WAP) and included the following:

- An exploration of the subsurface soil and groundwater conditions by excavating twenty (20) test pits to depths of approximately 4.5 to 9.5 feet below the existing ground surface;
- Prepare a site plan showing the exploration locations;
- Prepare comprehensive test pit logs including soil stratification and classification, and groundwater levels where applicable;
- Provide foundation recommendations for the proposed structures including foundation type, allowable bearing pressure, anticipated settlements (both total and differential), coefficient of horizontal friction, and frost penetration depth;

- Provide recommendations for seismic design considerations including site coefficient and ground acceleration based on the 2018 IBC;
- Provide recommendations for structural fill materials, placement, and compaction;
- Provide recommendations regarding the suitability of on-site soils as structural fill;
- Provide recommendations for temporary excavations;
- Provide slope stability analysis;
- Provide recommendations for site drainage and erosion control;
- Provide recommendations for the pavement design.

Environmental services, such as chemical analysis of soil and groundwater for possible environmental contaminants, were not included in our scope of services for this project.

PROPOSED CONSTRUCTION

We were provided with a preliminary plat plan, prepared by Zenovic and Associates, dated January 29, 2021, which indicates that the development will include design and construction of an 82-lot residential subdivision. The site development will also include design and construction of associated paved roads driveways and parking areas, utilities and landscape areas.

Foundation loads were not provided to us at the time this report was prepared. We have assumed isolated column loads of 40,000 to 50,000 pounds and wall loads of 1,000 to 2,000 pounds per lineal foot (plf) for our foundation and settlement analyses.

SITE CONDITIONS

The site consists of seven (7) parcels covering an area of approximately 28.12 acres. Elevations throughout the site range from approximately 110 feet to 230 feet. The site generally slopes gently down to the east from approximately 3 degrees (5 percent) to 6 degrees (10 percent). On the eastern edge of the site, the slope increases to approximately 7 degrees (13 percent) to 9 degrees (15 percent). A northern facing slope runs along the southern edge of the site which appears to range from approximately 10 degrees (18 percent) to 12 degrees (22 percent). The northwest corner of the site is situated on an east facing slope that ranges from 9 degrees (15 percent) to 11 degrees (20 percent).

The majority of the site is currently undeveloped and covered with tall grass. Few trees are scattered throughout the site. The site is bordered by single family residences to the north, south and west, and W Sequim Bay Road to the east. We did not observe signs of significant erosion or surface water during our site visit.

GEOLOGIC SETTING

The Geologic Map of the Washington Portion of the Port Angeles 1:100,00 Quadrangle prepared by the H.W. Schasse (2003) indicates that the site vicinity is underlain by Vashon till (Qgt). Vashon till is commonly described as lodgment till consisting of an unstratified, highly compacted mixture of poorly

sorted clay, silt, sand, gravel, and boulders deposited directly by glacier. Our explorations generally exposed native glacial soils with the exception of TP-1.

FIELD INVESTIGATION

Twenty (20) exploratory test pits were completed to evaluate the subsurface soil and groundwater conditions at the proposed development area. The test pits were excavated on April 21 and 22, 2021 and May 12 and 13, 2021 by Krazan. The test pits were excavated to depths ranging from approximately 4.5 feet to 9.5 feet below the existing ground surface (BGS).

Pilot Infiltration Tests (PITs): On June 29 and 30, 2021, and July 1, 2021 we performed one (1) Large-Scale PIT and three (3) Small-Scale PITs as per Volume III, Chapter 3 of the Department of Ecology (DOE) 2012 Stormwater Management Manual for Western Washington (SMMWW). *The excavation services for PITs were provided by the client.*

The PIT locations, labelled as INF-1 through INF-4, are shown on the Site Plan (Figure 2B). The PITs were performed at depths of about 5.5 feet to 8.0 feet BGS. The PIT locations and depths were based on our communication with the project civil engineer. The Large-Scale PIT exposed test area was roughly 121 square feet, and the Small-Scale PITs exposed areas ranged from 14 to 16 square feet. The tests included a pre-soak period, followed by steady-state testing, and then falling head infiltration rate testing. After the PITs were completed, the test pits were excavated to at least 3 feet below the test elevations to explore soil and groundwater conditions after the infiltration testing. We did not observe ponding or mounding of groundwater from the PITs to the maximum depth explored at 12.0 feet BGS.

A field engineer from Krazan and Associates was present during the explorations, examined the soils, the geologic conditions encountered, obtained samples of the different soil types, and maintained logs of the explorations.

Representative samples of the subsurface soils encountered in the test pits were collected and sealed in plastic bags. These samples were transported to our laboratory for further examination and testing. The soils encountered in the test pits were continuously examined and visually classified in accordance with the Unified Soil Classification System (USCS).

SOIL PROFILE AND SUBSURFACE CONDITIONS

This section of the report is intended to provide a general description of the subsurface conditions. Detailed descriptions of the soils exposed in each of the test pits are presented in the test pit logs in Appendix A.

Organic Topsoil: Our test pits exposed approximately 0.5 feet of organic topsoil.

Undocumented Fill: Underlying the organic topsoil, TP-1 exposed reddish-brown silty sand with gravel to the maximum depth explored at 7.5 feet. Rebar and concrete debris were also noted at about 6 feet BGS. We interpreted the entire layer to be undocumented fill. The rest of the test pits did not encounter undocumented fill. However, fill may be present in the unexplored areas of the site.

Native Glacial Soils: Underlying the organic topsoil, our test pits generally exposed sandy silt, and sand with varying amounts of silt and gravel to the maximum depths explored at roughly 4.5 to 12.0 feet BGS. The surficial soils were loose to depths of about 0.5 to 2.0 feet BGS, and were underlain by medium dense

to dense granular soils and stiff to very stiff cohesive soils. We interpreted this entire stratum to be native glacial soils.

Groundwater Observations: Groundwater seepage was not observed in any of the test pits. It should be noted that groundwater elevations may fluctuate with time. The groundwater levels will be dependent upon seasonal precipitation, irrigation, land use, and climatic conditions, as well as other factors. Therefore, groundwater levels at the time of the field investigation may be different from those encountered during the construction phase of the project. The evaluation of such factors is beyond the scope of this report

GEOLOGIC HAZARDS

Erosion Concern/Hazard

The Natural Resources Conservation Services (NRCS) map for Kitsap County Area, Washington, classifies the site as Yeary gravelly loam (0 to 15 percent slopes). The NRCS classifies Yeary gravelly loam as having moderately high potential for erosion in a disturbed state.

It has been our experience that soil erosion potential can be minimized through landscaping and surface water runoff control. Typically, erosion of exposed soils will be most noticeable during periods of rainfall and may be controlled by the use of normal temporary erosion control measures, such as silt fences, hay bales, mulching, control ditches or diversion trenching, and contour furrowing. Erosion control measures should be in place before the onset of wet weather.

Seismic Hazard

The 2018 International Building Code (IBC), Section 1613.2.2, refers to Chapter 20 of ASCE 7-16 for Site Class Definitions. It is our opinion that the overall soil profile corresponds to Site Class D as defined by Table 20.3-1 "Site Class Definitions," according to the ASCE 7-16 Standard. Site Class D applies to a "Stiff Soil" profile. Site Class D applies to a "stiff soil" profile. The seismic site class is based on a soil profile extending to a depth of 100 feet. The soil explorations on this site extended to a maximum depth of approximately 9.5 feet and this seismic site class designation is based on the assumption that similar or firmer soil conditions continue below the depth explored.

We referred to the Applied Technology Council (ATC) website and 2018 IBC to obtain values for S_S, S_{MS}, S_{DS}, S_1, S_{M1}, S_{D1}, F_a, F_v *and* T_s. The ATC website utilizes the most updated published data on seismic conditions from the United States Geological Survey. The seismic design parameters for this site are presented in the following table:

Seismic Design Parameters*
(Reference: 2018 IBC Section 1613.2.2, ASCE7-16, and ATC)

Seismic Item	Value
Site Coefficient F_a	1.000
S_s	1.364
S_{MS}	1.364
S_{DS}	0.909
Site Coefficient F_v	1.790
S_1	0.510
S_{M1}	0.913
S_{D1}	0.609
Ts	0.670

*Based on use of the Equivalent Lateral Force (ELF) Design Procedure.

Additional seismic considerations include liquefaction potential and amplification of ground motions by loose/soft soil deposits. The liquefaction potential is highest for loose sand with a high groundwater table. The medium dense to very dense native silty sand soils interpreted to underlie the site are considered to have a low potential for liquefaction and amplifications of ground motion.

The Liquefaction Susceptibility Map of Kitsap County, Washington, by Stephen Palmer, et al. (WADNR, September 2004) indicates that the property is located in an area of very low liquefaction susceptibility. Therefore, a site-specific liquefaction analysis was not performed.

CONCLUSIONS AND RECOMMENDATIONS

General

It is our opinion from a geotechnical standpoint that the site is compatible with the proposed development, provided that our geotechnical engineering recommendations are incorporated into project plans and are implemented during construction.

Soil Conditions: With the exception undocumented fill encountered in the TP-1, our soil explorations generally encountered up to 2.0 feet of loose soils overlying medium dense to dense native granular soils and stiff to very stiff native cohesive soils. There may be thicker layers of loose soils and undocumented fill in unexplored areas of the site.

Foundations: Based on our explorations, conventional spread footings supported on medium dense/stiff or firmer native soil, or on engineered structural fill extending to medium dense/stiff or firmer native soil, should provide adequate support for the proposed structures.

Stormwater Drainage and Infiltration: Proper site grading and drainage should help maintain current stability conditions. A comprehensive drainage plan will be an important part of a successful development

project at this site. We understand that stormwater infiltration systems are being proposed. Four in-situ infiltration tests were performed in the potential stormwater infiltration areas and are further discussed in the Stormwater Infiltration Rate section of this report.

Moisture Sensitive Soils: The soils encountered in our explorations are considered to be moisture sensitive and will be difficult to compact in wet conditions. The moisture content of the silty soils is important in determining if the soils can be used as structural fill at the time of construction. Krazan and Associates is available on request to evaluate the suitability of the on-site soils for use as structural fill material during earthwork construction.

Site Preparation

In general site clearing should include removal of any vegetation and associated root systems; wood; abandoned utilities; structures including foundations, rubble; and rubbish. After stripping of organic topsoil is completed, the building pad and pavement areas should be proof-rolled with a loaded tandem-axle dump truck and be visually inspected to identify any loose/soft areas.

Footing subgrade preparation: In the planned footing areas, any loose/soft soils should be excavated to expose the underlying firm native soils. The resulting excavations should be filled to the planned bottom of footing elevations with suitable soils as per the **Structural Fill** section of this report. *Based on our soil explorations, we interpreted the medium dense or firmer native load bearing soils at this site to be approximately up to 2.0 feet BGS with the exception of the TP-1 area where native load bearing soils were estimated to be about 7.5 feet BGS.*

Floor Slab and Pavement subgrade preparation: If loose/soft soils are encountered in the floor slab and pavement areas, the loose/soft soil should be removed to *at least 1-foot* below the planned subgrade elevation. We recommend that a high-strength woven geotextile separation fabric then be placed over the entire overexcavated grade, such as Miraffi 600X or equivalent. After the fabric is placed, the area should be filled to the planned subgrade elevation with suitable soils as recommended in the **Structural Fill** section of this report. In the exterior flatwork (sidewalk) areas, any loose/soft soil should be removed to *at least 6-inches* below the planned subgrade. Fabric will not be needed for sidewalk areas. *Deeper excavation may be required, if yielding soil conditions are exposed during over-excavation.*

During wet weather conditions, which typically occur from October through May, subgrade stability problems and grading difficulties may develop due to excess moisture, disturbance of moisture sensitive soils and/or the presence of perched groundwater. Earthwork construction during extended periods of wet weather could create the need to remove wet disturbed soils if they cannot be suitably compacted due to elevated moisture contents. Most of the on-site soils encountered in our test pits are considered to be moisture sensitive, and can be easily disturbed when wet. If over-excavation is necessary, it should be confirmed through continuous monitoring and testing by a qualified geotechnical engineer or geologist. Soils that have become unstable may require drying to near their optimal moisture content before compaction is feasible. Selective drying may be accomplished by scarifying or windrowing surficial material during extended periods of dry, warm weather (typically during the summer months). If the soils cannot be dried back to a workable moisture condition, remedial measures may be required. Preparation

of the site for wet weather conditions may consist of the placement of a layer of aggregate base for the protection of exposed soils during construction.

It should be understood that even if Best Management Practices (BMP's) for soil protection are implemented for the wet season, there is a significant chance that additional soil mitigation work will be needed.

Any buried structures encountered during construction should be completely removed and backfilled with structural fill. Excavations, depressions, or soft and pliant areas extending below the planned subgrade elevations should be excavated to expose medium dense or firmer soil, and be backfilled with structural fill. In general, any septic tanks, underground storage tanks, debris pits, cesspools, or similar structures and deleterious materials should be completely removed. Any concrete footings encountered in the planned foundation area should be removed to depth of at least 3 feet below proposed footing elevations or as recommended by the geotechnical engineer. The resulting excavations should be backfilled with structural fill.

All fill on the sloping areas should be placed as structural fill. Where fills greater than 8 feet are to be constructed on original ground that slopes at inclinations steeper than 6:1 (horizontal to vertical), benches should be cut into the existing slope as the filling operations proceed. Each bench should consist of a level terrace, a minimum of 4 to 8 feet wide (based on the width of the equipment utilized), with the rise to the next bench held to 4 feet or less. Where fills of comparable height will be constructed on ground that slopes at an inclination steeper than 4:1 (horizontal to vertical), a keyway should be provided along the toe of the fill slope in addition to the benches. Each keyway should consist of a level trench at least 8 feet wide and at least 2 feet deep, with side slopes not exceeding 1:1 (horizontal to vertical), cut into the existing slope.

The permanent slopes should be no steeper than 2 to 1 (horizontal to vertical). Fill materials should not be placed in any section of the slope until the subgrade for that section has been suitably prepared and evaluated by a representative of the geotechnical engineer. Any brush, roots, sod or other perishable or unsuitable material should not be placed in the fill slope.

Site grading near the crowns of the reconstructed slopes should be accomplished, such that, excessive sheet run-off is prevented. The completed slopes should be seeded or otherwise vegetated to protect from future erosion. Well vegetated slopes at the recommended configuration should be reasonably protected from typical erosional effects. However, vegetated slopes may not be protected from unusual flow conditions, such as flood events or concentrations of stormwater runoff occur on the slopes.

A representative of our firm should be available on request during all grading operations to observe, test and evaluate earthwork construction. This testing and observation is an integral part of our service, as acceptance of earthwork construction is dependent upon compaction and stability of the material. The geotechnical engineer may reject any material that does not meet compaction and stability requirements. Further recommendations, contained in this report, are predicated upon the assumption that earthwork construction will conform to the recommendations set forth in this section and in the Structural Fill section of this report.

Temporary Excavations

The on-site soils have variable cohesion strengths, therefore the safe angles to which these materials may be cut for temporary excavations is limited, as the soils may be prone to caving and slope failures in temporary excavations deeper than 4 feet. We did not note significant caving in the test pits. Temporary excavations in the existing materials should be sloped no steeper than 1.5H:1V (horizontal to vertical) where room permits. Flatter inclinations may be necessary where caving conditions and groundwater seepage are encountered.

All temporary cuts should be in accordance with Washington Administrative Code (WAC) Part N, Excavation, Trenching, and Shoring. The temporary slope cuts should be visually inspected daily by a qualified person during construction work activities and the results of the inspections should be included in daily reports. The contractor is responsible for maintaining the stability of the temporary cut slopes and minimizing slope erosion during construction. The temporary cut slopes should be covered with plastic sheeting to help minimize erosion during wet weather and the slopes should be closely monitored until the permanent retaining systems are complete. Materials should not be stored and equipment operated within 10 feet of the top of any temporary cut slope.

A Krazan & Associates geologist or geotechnical engineer should observe, at least periodically, the temporary cut slopes during the excavation work. The reason for this is that all soil conditions may not be fully delineated by the limited sampling of the site from the geotechnical explorations. In the case of temporary slope cuts, the existing soil conditions may not be fully revealed until the excavation work exposes the soil. Typically, as excavation work progresses the maximum inclination of the temporary slope will need to be evaluated by the geotechnical engineer so that supplemental recommendations can be made. Soil and groundwater conditions can be highly variable. Scheduling for soil work will need to be adjustable, to deal with unanticipated conditions, so that the project can proceed smoothly and required deadlines can be met. If any variations or undesirable conditions are encountered during construction, Krazan & Associates should be notified so that supplemental recommendations can be made.

Structural Fill

Fill placed beneath foundations or other settlement-sensitive structures should be placed as structural fill. Structural fill, by definition, is placed in accordance with prescribed methods and standards, and is monitored by an experienced geotechnical professional. Field monitoring procedures would include the performance of a representative number of in-place density tests to document the attainment of the desired degree of relative compaction. The area to receive the fill should be suitably prepared as described in the **Site Preparation** subsection of this report prior to beginning fill placement. A representative of the geotechnical engineer should evaluate the subgrade prior to structural fill placement.

BMP's should be followed when considering the suitability of the existing materials for use as structural fill. With the exception of sandy silt, the on-site soils may be suitable for reuse as structural fill, provided the soil is free of organic material and debris, and it is within ± 2 percent of the optimum moisture content. It should be noted that the on-site soils indicated percentage of silt and clay (passing no. 200 sieve) to be in the range of 6 to 89. The on-site soils with percentage of silt and clay greater than 5 percent will be difficult to compact during the wet weather. Cobles and boulders were not encountered in our explorations.

However, cobbles and boulders may be present in native glacial soils and should be screened prior to use as structural fill. If the native soils are stockpiled for later use as structural fill, the stockpiles should be covered to protect the soil from wet weather conditions. We recommend that a representative of Krazan & Associates be on site during the excavation work to determine which soils are suitable for placement as structural fill.

Imported, all weather granular structural fill material should consist of well-graded gravel or a mixture of sand and gravel with a maximum grain size of 3 inches and less than 5 percent fines (material passing the U.S. Standard No. 200 Sieve). Structural fill can also consist crushed rock, rock spalls and controlled density fill (CDF). All structural fill material should be submitted for approval to the geotechnical engineer at least 48 hours prior to delivery to the site.

Granular structural fill soils should be placed in horizontal lifts not exceeding 8 inches in thickness prior to compaction, moisture-conditioned as necessary, (moisture content of soil shall not vary by more than ±2 percent of optimum moisture) and the material should be compacted to at least 95 percent of the maximum dry density based on ASTM D1557 Test Method. In-place density tests should be performed on all structural fill to document proper moisture content and adequate compaction. Additional lifts should not be placed if the previous lift did not meet the compaction requirements or if soil conditions are not considered stable.

Fill placed on slopes should be placed as structural fill. Sloping areas to receive fill should be benched for added stability. The benches should be horizontal with a minimum width of four feet.

Shallow Foundations

General: The proposed structures may be supported on a conventional spread foundation. Foundation subgrade should be prepared as per the Site Preparation section of this report.

Soil Bearing: Conventional shallow spread footings supported on medium dense/stiff or firmer native soils, or on structural fill extending to the medium dense/stiff or firmer native soils, may be designed using an allowable soil bearing pressure of **2,500 pounds per square foot (psf)** for dead plus live loads. This value may be increased by 1/3 for short duration loads such as wind or seismic loading. We have assumed isolated column loads of 40,000 to 50,000 pounds and wall loads of 1,000 to 2,000 plf for our foundation and settlement analyses. *We should be contacted to re-evaluate the potential settlement and the allowable bearing pressure, if the design loads vary significantly from these assumed values.* A representative of Krazan and Associates should evaluate the foundation bearing soil and observe structural fill placement, where utilized.

Footings should have a minimum embedment depth of 18 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. Footing widths should be based on the anticipated loads and allowable soil bearing pressure. Footings should have a minimum width of at least 12 inches regardless of load. Water should not be allowed to accumulate in footing trenches. All loose or disturbed soils should be removed from the foundation excavations prior to placing concrete.

Structural Fill in Footing Areas: If structural fill consisting of granular soils and rock spalls are used, then the foundation excavations would need to be widened on both sides of the footing a distance equal to

one-half of the depth of the over-excavation below the bottom of the footing. Structural fill consisting of granular soils should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. To reduce the volume of extra excavation needed for the footing trenches and to simplify structural fill placement, it may be practical to place CDF to fill the deeper footing trenches to the planned footing subgrade elevations. If CDF is used, the trench may be excavated only slightly wider (6 inches wider on each side) than the footing.

Potential Foundation Settlement: For foundations constructed as recommended, the total settlement is not expected to exceed 1-inch. Differential settlement should be less than ½-inch. Most settlement is expected to occur during construction, as the loads are applied. However, additional post-construction settlement may occur if the foundation soils are flooded or saturated. It should be noted that the risk of liquefaction is considered low, given the composition and density of the native, on-site soils.

Design Parameters – Lateral Resistance: Resistance to lateral displacement can be computed using an allowable friction factor of 0.40 acting between the bases of foundations and the supporting competent native subgrade soil. Lateral resistance for footings can also be developed using an allowable equivalent fluid passive pressure of 250 pounds per cubic foot (pcf) acting against the appropriate vertical footing faces (neglecting the upper 12 inches). The allowable friction factor and allowable equivalent fluid passive pressure values include a factor of safety of 1.5. The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance.

Foundation Drainage: Seasonal rainfall, water run-off, and the normal practice of watering trees and landscaping areas around the proposed structures should not be permitted to flood and/or saturate foundation subgrade soils. To prevent the buildup of water within the footing areas, continuous footing drains (with cleanouts) should be provided at the base of the footings. The footing drains should consist of a minimum 4-inch diameter rigid perforated PVC pipe, sloped to drain, with perforations placed near the bottom and enveloped in all directions by washed rock and wrapped with filter fabric to limit the migration of silt and clay into the drain.

Lateral Earth Pressures and Retaining Walls

We have developed criteria for the design of retaining or below grade walls. Our design parameters are based on retention of the native soils or structural fill. The wall design criteria are based on the total unit weight of backfill of 130 pounds per cubic foot (pcf) and friction angle of 34 degrees. The parameters are also based on level, well-drained wall backfill conditions. Walls may be designed as "restrained" retaining walls based on "at-rest" earth pressures, plus any surcharge on top of the walls as described below, if the walls are braced to restrain movement and/or movement is not acceptable. Unrestrained walls may be designed based on "active" earth pressure, if the walls are not part of the buildings and some movement of the retaining walls is acceptable. Acceptable lateral movement equal to at least 0.2 percent of the wall height would warrant the use of "active" earth pressure values for design.

The following table, titled **Wall Design Criteria**, presents the recommended soil related design parameters for retaining walls with well-drained level backfill.

Wall Design Criteria	
"At-rest" Conditions (Lateral Earth Pressure)	55 pcf (Equivalent Fluid Density) (Triangular Distribution)
"Active" Conditions (Lateral Earth Pressure)	35 pcf (Equivalent Fluid Density) (Triangular Distribution)
Seismic Increase for "Active" Conditions (Lateral Earth Pressure)	7 psf x H (Uniform Distribution) Where H is the height of the wall in feet
Passive Earth Pressure on Low Side of Wall (includes factor of safety of 1.5)	Neglect upper 1-foot, then 250 pcf (Equivalent Fluid Density)
Soil-Footing Coefficient of Sliding Friction (includes factor of safety of 1.5)	0.4

The stated lateral earth pressures **do not** include the effects of hydrostatic pressure generated by water accumulation behind the retaining walls or loads imposed by construction equipment, foundations or roadways adjacent to the wall (surcharge loads). To minimize the lateral earth pressure and prevent the buildup of water pressure against the walls, continuous footing drains (with cleanouts) should be provided at the bases of the walls. The footing drains should consist of a minimum 4-inch diameter rigid PVC perforated pipe, sloped to drain, with perforations placed near the bottom. The drainpipe should be enveloped by 6 inches of washed gravel in all directions wrapped in filter fabric to prevent the migration of silt and clay into the drain.

The wall fill adjacent to and extending a lateral distance of at least 2 feet behind the walls should consist of free-draining granular material. All free-draining backfill should contain less than 3 percent fines (passing the U.S. Standard No. 200 Sieve) based upon the fraction passing the U.S. Standard No. 4 Sieve with at least 30 percent of the material being retained on the U.S. Standard No. 4 Sieve. **Alternatively,** a drainage composite may be used. It should be realized that the primary purpose of the free-draining material is the reduction of hydrostatic pressure. Some potential for the moisture to contact the back face of the wall may exist, even with treatment, which may require that more extensive waterproofing be specified for walls, which require interior moisture sensitive finishes.

We recommend that the wall fill be compacted to at least 95 percent of the maximum dry density based on ASTM D1557 Test Method. In-place density tests should be performed to verify adequate compaction. Soil compactors place transient surcharges on the backfill. Consequently, only light hand operated equipment is recommended for fill compaction within 3 feet of walls so that excessive stress is not imposed on the walls.

Floor Slabs and Exterior Flatwork

The floor slab and exterior flatwork subgrade should be prepared in accordance with the recommendations presented in the **Site Preparation** section of this report, and may be designed using a modulus of subgrade reaction value of k = 200 pounds per cubic inch (pci).

Any additional fill used to increase the elevation of the floor slab should meet the requirements of structural fill. Fill soils should be placed in horizontal lifts not exceeding 8 inches loose thickness, moisture-conditioned as necessary (moisture content of soil shall not vary by more than ±2 percent of optimum moisture), and the material should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557.

In areas where it is desired to reduce floor dampness, such as areas covered with moisture sensitive floor coverings, we recommend that concrete slab-on-grade floors be underlain by a water vapor retarder system. The water vapor retarder should consist of a vapor retarder sheeting underlain by a minimum of 4-inches of compacted clean (less than 5 percent passing the U.S. Standard No. 200 Sieve), open-graded coarse rock of ¾-inch maximum size. The vapor retarder sheeting should be protected from puncture damage. In addition, ventilation of the structure may be prudent to reduce the accumulation of interior moisture.

Erosion and Sediment Control

Erosion and sediment control (ESC) is used to minimize the transportation of sediment to wetlands, streams, lakes, drainage systems, and adjacent properties. Erosion and sediment control measures should be implemented and these measures should be in general accordance with local regulations. As a minimum, the following basic recommendations should be incorporated into the design of the erosion and sediment control features of the site:

1) Phase the soil, foundation, utility and other work, requiring excavation or the disturbance of the site soils, to take place during the dry season (generally May through September). However, provided precautions are taken using Best Management Practices (BMP's), grading activities can be undertaken during the wet season (generally October through April), but it should also be known that this may increase the overall cost of the project.

2) All site work should be completed and stabilized as quickly as possible.

3) Additional perimeter erosion and sediment control features may be required to reduce the possibility of sediment entering the surface water. This may include additional silt fences, silt fences with a higher Apparent Opening Size (AOS), construction of a berm, or other filtration systems.

4) Any runoff generated by dewatering discharge should be treated through construction of a sediment trap if there is sufficient space. If space is limited, other filtration methods will need to be incorporated.

Groundwater Influence on Structures and Earthwork Construction

The test pits were checked for the presence of groundwater during exploratory operations. Groundwater seepage was **not** observed in any of the test pits. It should be recognized that groundwater elevations may fluctuate with time. The groundwater level will be dependent upon seasonal precipitation, irrigation, land use, and climatic conditions, as well as other factors. Therefore, groundwater levels at the time of the field

investigation may be different from those encountered during the construction phase of the project. The evaluation of such factors is beyond the scope of this report.

If groundwater is encountered during construction, we should observe the conditions to determine if dewatering will be needed. Design of temporary dewatering systems to remove groundwater should be the responsibility of the contractor. If earthwork is performed during or soon after periods of precipitation, the subgrade soils may become saturated. These soils may "pump," and the materials may not respond to densification techniques. Typical remedial measures include: disking and aerating the soil during dry weather; mixing the soil with drier materials; removing and replacing the soil with an approved fill material. A qualified geotechnical engineering firm should be consulted prior to implementing remedial measures to observe the unstable subgrade conditions and provide appropriate recommendations.

Drainage and Landscape

Special attention to the drainage and irrigation adjacent to the buildings is recommended. Grading should establish drainage away from the structures and this drainage pattern should be maintained. Water should not be allowed to collect adjacent to the structures. Excessive irrigation within landscaped areas adjacent to the structure should not be allowed to occur.

The ground surface should slope away from building pads and pavement areas, toward appropriate drop inlets or other surface drainage devices. It is recommended that adjacent exterior grades be sloped a minimum of 2 percent for a minimum distance of 5 feet away from structures. Roof drains should be tightlined away from foundations. Roof drains should not be connected to the footing drains.

Pavement areas should be inclined at a minimum of 1 percent and drainage gradients should be maintained to carry all surface water to collection facilities, and suitable outlets. These grades should be maintained for the life of the project.

Specific recommendations for and design of storm water disposal systems or septic disposal systems are beyond the scope of our services and should be prepared by other consultants that are familiar with design and discharge requirements.

Utility Trench Backfill

Utility trenches should be excavated according to accepted engineering practices following OSHA (Occupational Safety and Health Administration) standards, by a contractor experienced in such work. The responsibility for the safety of open trenches should be borne by the contractor. Traffic and vibration adjacent to trench walls should be minimized; cyclic wetting and drying of excavation side slopes should be avoided.

We recommend that utility trench backfill be placed in general accordance with typical recommendations for structural fill placement. A firm and unyielding subgrade should allow for the proper placement of subsurface utilities. This could include the placement of geotextile and quarry rock in the bottom of utility trenches prior to placement of pipe bedding, utilities and trench backfill.

All utility trench backfill should consist of suitable on-site material or imported granular material. Utility trench backfill placed in or adjacent to buildings and exterior slabs should be compacted to at least 95

percent of the maximum dry density based on ASTM Test Method D1557. The upper 5 feet of utility trench backfill placed in pavement areas should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Below 5 feet, utility trench backfill in pavement areas should be compacted to at least 90 percent of the maximum dry density based on ASTM Test Method D1557. Pipe bedding should be in accordance with the pipe manufacturer's recommendations.

It is recommended that the utility trenches within the building pads be compacted, as specified in this report, to minimize the transmission of moisture through the utility trench backfill.

The contractor is responsible for removing all water-sensitive soils from the trenches regardless of the backfill location and compaction requirements. The contractor should use appropriate equipment and methods to avoid damage to the utilities and/or structures during fill placement and compaction.

Stormwater Infiltration Rate

We performed one (1) Large-Scale Pilot Infiltration Test (PIT), and four (4) Small-Scale PITs in accordance with Volume III, Chapter 3 of the Department of Ecology (DOE) 2012 Stormwater Management Manual for Western Washington (SMMWW).

The design infiltration rates were developed per the Large-Scale and Small-Scale PIT methods in accordance with Volume III, Chapter 3 of the DOE 2012 SWMMWW. These methods provide a field test to estimate the initial saturated hydraulic conductivity (K_{sat}) for the subsurface soils encountered below the proposed infiltration facility. **Correction factors** are then applied to this measured value to account for site variability and number of locations tested, test method, and degree of influent control. The correction factors utilized are listed below:

- Site variability and number of locations tested (CF_v) = 0.9
- Uncertainty of test method (CF_t) = 0.50 (Small-Scale PIT), and 0.75 (Large-Scale PIT)
- Degree of influent control to prevent siltation and bio-buildup (CF_m) = 0.9

Changes in soil conditions and the corresponding infiltration rates are possible at different locations and depths. Accordingly, we recommend that the subsurface soils be evaluated during construction by a representative of the geotechnical engineer.

The design infiltration rates are provided in the following table. The rate provided is a long-term design infiltration rate. In our opinion, this design infiltration rate should be appropriate provided that the planned pretreatment measures for control of total suspended solids are adequately maintained. The on-site stormwater infiltration system should be designed by a Washington State Licensed Civil Engineer.

Design Infiltration Rates			
Test Pit Number	Test Depth (Feet)	Soil Classification	Infiltration Rate (inches/hour)
INF-1	5.5	Sand with Silt and Gravel	0.3
INF-2	6.0	Sand with Silt and Gravel	1.1
INF-3	8.0	Sand with Gravel	3.5
INF-4	6.0	Sand with Silt and Gravel	0.4

Organic Content: Our laboratory in Poulsbo performed the organic content testing (ASTM D-2974) on soil samples from INF-1, INF-2, and INF-3. The test results for the soil samples are presented in the following table.

Organic Content			
Test Pit Number	Sample Depth (Feet)	Soil Classification	Organic Content
INF-1	5.5	Sand with Silt and Gravel	5.2%
INF-2	6.0	Sand with Silt and Gravel	0.7%
INF-3	8.0	Sand with Gravel	4.4%

Cation Exchange Capacity (CEC): CEC refers to the ability of soil to hold cation nutrients. Different soil types have different CEC values. In general, clay, silt and organic matter tend to have higher CEC values than sand and gravel. CEC is typically measured in milliequivalents (meq/100g). Soil samples of from INF-1, INF-2, and INF-3 were processed by Spectra Laboratories in Poulsbo, WA for CEC determination. CEC test results are presented in the following table. The test result information from Spectra Laboratories is also attached to this report.

Cation Exchange Capacity (CEC)			
Test Pit Number	Sample Depth (Feet)	Soil Classification	Cation Exchange Capacity (meq/100g)
INF-1	5.5	Sand with Silt and Gravel	7.8
INF-2	6.0	Sand with Silt and Gravel	8.1
INF-3	8.0	Sand with Gravel	13.1

Pavement Design

The pavement subgrade should be prepared in accordance with the recommendations presented in the **Site Preparation** section of this report. It should be noted that subgrade soils that have relatively high silt contents may be highly sensitive to moisture conditions. The subgrade strength and performance characteristics of a silty subgrade material may be dramatically reduced if it becomes wet. Therefore, we recommend that the pavement subgrade not be exposed for long periods, especially during wet weather.

Traffic loads were not provided, however, based on our knowledge of the proposed project, we expect the traffic to range from light duty (passenger automobiles) to heavy duty (firetrucks). The following tables show the minimum recommended pavement sections for both light duty and heavy-duty traffic loads.

ASPHALTIC CONCRETE (FLEXIBLE) PAVEMENT
LIGHT DUTY

Asphaltic Concrete	Aggregate Base*
3.0 in.	6.0 in.

ASPHALTIC CONCRETE (FLEXIBLE) PAVEMENT
HEAVY DUTY

Asphaltic Concrete	Aggregate Base*
4.0 in.	6.0 in.

PORTLAND CEMENT CONCRETE (RIGID) PAVEMENT

Min. PCC Depth	Aggregate Base*
6.0 in.	6.0 in.

** 95% compaction based on ASTM Test Method D1557*

The pavement specification in Appendix C provides additional recommendations. The asphaltic concrete depth in the flexible pavement tables should be a surface course type asphalt, such as Washington Department of Transportation (WSDOT) ½ inch HMA. The rigid pavement design is based on a Portland Cement Concrete (PCC) mix that has a 28-day compressive strength of 4,000 pounds per square inch (psi) with a fiber mesh. The design is also based on a concrete flexural strength or modulus of rupture of 575 psi.

Testing and Inspection

A representative of Krazan & Associates, Inc. should be present at the site during the earthwork activities to confirm that actual subsurface conditions are consistent with the exploratory fieldwork. This activity is an integral part of our services as acceptance of earthwork construction is dependent upon compaction testing and stability of the material. This representative can also verify that the intent of these recommendations is incorporated into the project design and construction. Krazan & Associates, Inc. will not be responsible for grades or staking, since this is the responsibility of the Prime Contractor. Furthermore, Krazan & Associates is not responsible for the contractor's procedures, methods, scheduling or management of the work site.

LIMITATIONS

This report has been prepared for the exclusive use of the Mariners Investors, LTD and their assigns. Geotechnical engineering is one of the newest divisions of Civil Engineering. This branch of Civil Engineering is constantly improving as new technologies and understanding of earth sciences improves. Although your site was analyzed using the most appropriate current techniques and methods, undoubtedly there will be substantial future improvements in this branch of engineering. In addition to improvements in the field of geotechnical engineering, physical changes in the site either due to excavation or fill placement, new agency regulations or possible changes in the proposed structure after the time of completion of the soils report may require the soils report to be professionally reviewed. In light of this, the owner should be aware that there is a practical limit to the usefulness of this report without critical review. Although the time limit for this review is strictly arbitrary, it is suggested that two years be considered a reasonable time for the usefulness of this report.

Foundation and earthwork construction is characterized by the presence of a calculated risk that soil and groundwater conditions have been fully revealed by the original foundation investigation. This risk is derived from the practical necessity of basing interpretations and design conclusions on limited sampling of the earth. Our report, design conclusions and interpretations should not be construed as a warranty of the subsurface conditions. Actual subsurface conditions may differ, sometimes significantly, from those indicated in this report. The recommendations made in this report are based on the assumption that soil conditions do not vary significantly from those disclosed during our field investigation. The findings and conclusions of this report can be affected by the passage of time, such as seasonal weather conditions, manmade influences, such as construction on or adjacent to the site, natural events such as earthquakes, slope instability, flooding, or groundwater fluctuations. If any variations or undesirable conditions are encountered during construction, the geotechnical engineer should be notified so that supplemental recommendations can be made.

The conclusions of this report are based on the information provided regarding the proposed construction. If the proposed construction is relocated or redesigned, the conclusions in this report may not be valid. The geotechnical engineer should be notified of any changes so that the recommendations can be reviewed and reevaluated.

Misinterpretations of this report by other design team members can result in project delays and cost overruns. These risks can be reduced by having Krazan & Associates, Inc. involved with the design team's meetings and discussions after submitting the report. Krazan & Associates, Inc. should also be retained for reviewing pertinent elements of the design team's plans and specifications. Contractors can also misinterpret this report. To reduce this, risk Krazan & Associates. Inc. should participate in pre-bid and preconstruction meetings, and provide construction observations during the site work.

This report is a geotechnical engineering investigation with the purpose of evaluating the soil conditions in terms of foundation design. The scope of our services did not include any environmental site assessment for the presence or absence of hazardous and/or toxic materials in the soil, groundwater or atmosphere, or the presence of wetlands. Any statements or absence of statements, in this report or on any soils log regarding odors, unusual or suspicious items, or conditions observed are strictly for descriptive purposes and are not intended to convey engineering judgment regarding potential hazardous and/or toxic assessments.

The geotechnical information presented herein is based upon professional interpretation utilizing standard engineering practices and a degree of conservatism deemed proper for this project. It is not warranted that such information and interpretation cannot be superseded by future geotechnical developments. We emphasize that this report is valid for this project as outlined above, and should not be used for any other site. Our report is prepared for the exclusive use of our client. No other party may rely on the product of our services unless we agree in advance to such reliance in writing.

If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office at (360) 598-2126.

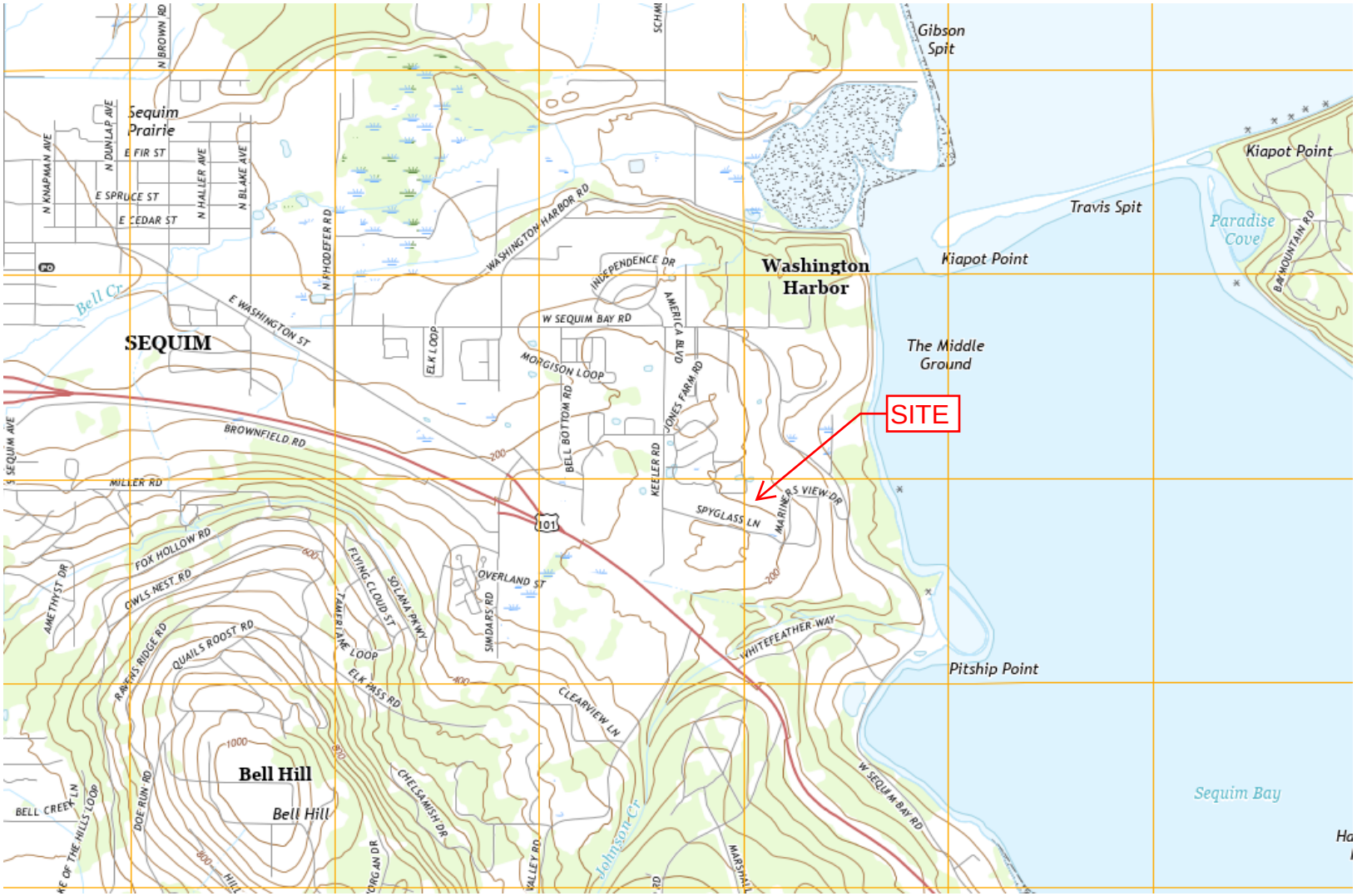
Respectfully submitted,
KRAZAN & ASSOCIATES, INC.

7/26/21

Vijay Chaudhary, P.E.
Project Engineer

EB:VC:MDR

Vicinity Map



Reference: USGS topographic map titled "Sequim Quadrangle, Wasington - Clallam County, 7.5-Minute Series", dated 2020.

Krazan

Mariners Outlook - Phase III, Sequim, WA		
Date: May 2021	Project Number: 102-21014	
Drawn By: EB	Figure: 1	Not to scale

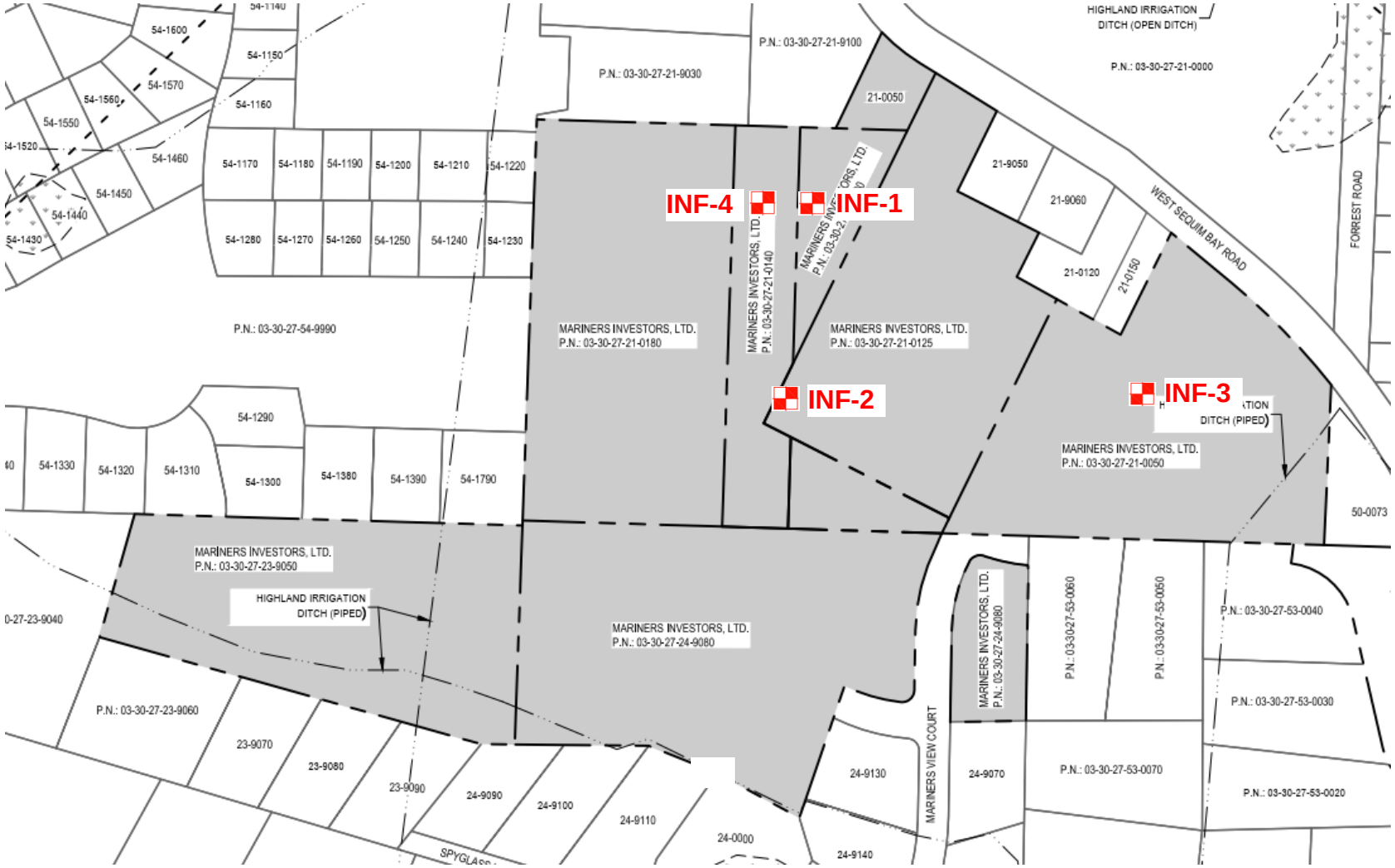
Site Plan

TP-1 Number and Approximate Location of Test Pits

Reference: Vicinity Map provided by Zenovic and Associates, dated January 29, 2021.

Krazan		
Mariners Outlook - Phase III		
Date: May 2021	Project Number: 102-21014	
Drawn By: EB	Figure: 2A	Not to scale

Site Plan



Reference: Vicinity Map provided by Zenovic and Associates, dated January 29, 2021

INF-1 Number and Approximate Location of Infiltration Test Pits

Krazan		
Mariners Outlook - Phase III		
Date: July 2021	Project Number: 102-21014	
Drawn By: EB	Figure: 2B	Not to scale

APPENDIX A

FIELD INVESTIGATION – LABORATORY TESTING

Field Investigation

The field investigation consisted of a surface reconnaissance and a subsurface exploration program. Twenty (20) exploratory test pits were excavated and sampled for subsurface exploration at this site. The test pits were excavated and completed on April 21 and 22, 2021 and May 12 and 13, 2021. The test pits were excavated to depths of approximately 4.5 feet to 9.5 feet BGS.

Additionally, on June 29 and 30, 2021, and July 1, 2021 we performed one (1) Large-Scale PIT and three (3) Small-Scale PITs as per Volume III, Chapter 3 of the DOE 2012 Stormwater SMMWW. *The excavation services for PITs were provided by the client.* the infiltration test pits were excavated to depths of approximately 9.0 to 12.0 feet BGS.

The approximate exploratory test pit locations are shown on the Site Plans (Figure 2A and 2B). The depths shown on the attached test pit logs are from the existing ground surface at the time of our exploration.

The soils encountered were logged in the field during the exploration and are described in accordance with the Unified Soil Classification System (USCS). All samples were returned to a Krazan laboratory for further evaluation and testing. The logs of the soil exploration are presented in this appendix.

Laboratory Testing

The laboratory testing program was developed primarily to determine the index properties of the soils. Test results were used for soil classification and as criteria for determining the engineering suitability of the surface and subsurface materials encountered. Our laboratory testing on selected samples indicated that the percentage of gravel ranged from 0 to 24, sand ranged from 8 to 86, and silt and clay (passing no. 200 sieve) ranged from 4.5 to 89. Natural moisture contents ranged from 3.4 to 7.2 percent. The laboratory test results are included in this appendix.

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-1

PROJECT: 10221014
PROJECT NO.: Mariner's Outlook
CONTRACTOR: N/A
SAMPLE METHOD: Grab

DATE: 4/21/21
PAGE: 1 of 1
SURFACE ELEV.: N/A
LOCATION: Sequim, WA

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits 10 20 30 40 50 60 70 80
0			Organic topsoil			
			Reddish brown silty sand with gravel (loose, moist)			
3				S-1	G	
4			-Soil becomes sandier below 4.0 feet	S-2	G	
6			-Rebar and concrete debris encountered at 6.0 feet	S-3	G	
7			End of Exploratory Test Pit			

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: WM

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-2

PROJECT: 10221014 | **DATE: 4/21/21**
PROJECT NO.: Mariner's Outlook | **PAGE: 1 of 1**
CONTRACTOR: N/A | **SURFACE ELEV.: N/A**
SAMPLE METHOD: Grab | **LOCATION: Sequim, WA**

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
			Organic topsoil			
1			Grayish brown silty sand with gravel (loose to medium dense, moist)	S-1	G	
2			-Soil becomes medium dense below 2.0 feet			
3						
4						
5			Gray sandy silt (stiff to very stiff, moist)	S-2	G	
6			-Soil becomes very stiff below 6.0 feet			
7			End of Exploratory Test Pit			
8						
9						
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: WM

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-3

PROJECT: 10221014
PROJECT NO.: Mariner's Outlook
CONTRACTOR: N/A
SAMPLE METHOD: Grab

DATE: 4/21/21
PAGE: 1 of 1
SURFACE ELEV.: N/A
LOCATION: Sequim, WA

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
0			Organic topsoil			
1			Grayish brown silty sand with gravel (medium dense, moist)			
2			Gray silt (very stiff, moist)			
3						
4						
5				S-1	G	
			End of Exploratory Test Pit			
6						
7						
8						
9						
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: WM

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-4

PROJECT: 10221014 | **DATE: 4/21/21**
PROJECT NO.: Mariner's Outlook | **PAGE: 1 of 1**
CONTRACTOR: N/A | **SURFACE ELEV.: N/A**
SAMPLE METHOD: Grab | **LOCATION: Sequim, WA**

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
			Organic topsoil			
1			Grayish brown silty sand with gravel (medium dense to dense, moist)			
2						
3			-Soil becomes dense below 3.0 feet			
4						
5				S-1	G	
6						
			End of Exploratory Test Pit			
7						
8						
9						
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was encountered at 3.0 feet

Logged By: WM

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-5

PROJECT: 10221014
PROJECT NO.: Mariner's Outlook
CONTRACTOR: N/A
SAMPLE METHOD: Grab

DATE: 4/21/21
PAGE: 1 of 1
SURFACE ELEV.: N/A
LOCATION: Sequim, WA

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
0			Organic topsoil			
			Gray silty sand (dense, moist)			
3.5			Grayish brown poorly graded sand with silt (dense, moist)	S-1	G	
7			End of Exploratory Test Pit	S-2	G	

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: WM

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-6

PROJECT: 10221014 | **DATE: 4/21/21**
PROJECT NO.: Mariner's Outlook | **PAGE: 1 of 1**
CONTRACTOR: N/A | **SURFACE ELEV.: N/A**
SAMPLE METHOD: Grab | **LOCATION: Sequim, WA**

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
0			Organic topsoil			
			Brown silty sand with gravel (medium dense, moist)			
6			Brown well graded sand with silt (dense, moist)			
7				S-1	G	
			End of Exploratory Test Pit			

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: WM

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-7

PROJECT: 10221014 | **DATE: 4/22/21**
PROJECT NO.: Mariner's Outlook | **PAGE: 1 of 1**
CONTRACTOR: N/A | **SURFACE ELEV.: N/A**
SAMPLE METHOD: Grab | **LOCATION: Sequim, WA**

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
0			Organic topsoil			
			Grayish-brown silty sand with gravel (medium dense, moist)			
4			Brown poorly graded gravel with sand (dense, moist)			
6			Brown sandy silt (very stiff, moist)			
8			End of Exploratory Test Pit			
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: WM

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-8

PROJECT: 10221014 | **DATE: 5/12/21**
PROJECT NO.: Mariner's Outlook | **PAGE: 1 of 1**
CONTRACTOR: N/A | **SURFACE ELEV.: N/A**
SAMPLE METHOD: Grab | **LOCATION: Sequim, WA**

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
0			Organic topsoil			
			Light brown silty sand with gravel (medium dense, moist)			
2			-Roots encountered up to 2.5 feet	S-1	G	
			Brown silty sand with gravel (dense, moist)			
4				S-2	G	
6			Brown poorly graded sand with gravel (dense, moist)	S-3	G	
8			End of Exploratory Test Pit			
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-9

PROJECT: 10221014 | **DATE: 5/12/21**
PROJECT NO.: Mariner's Outlook | **PAGE: 1 of 1**
CONTRACTOR: N/A | **SURFACE ELEV.: N/A**
SAMPLE METHOD: Grab | **LOCATION: Sequim, WA**

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
0			Organic topsoil			
			Light brown silty sand with gravel (medium dense, moist)			
1						
2						
3						
			-Roots encountered up to 4.0 feet			
4			Brown poorly graded sand with gravel (medium dense to dense, moist)			
5						
			-Soil becomes dense below 5.5 feet			
6						
7						
8						
9						
			End of Exploratory Test Pit			
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-10

PROJECT: 10221014 | **DATE: 5/12/21**
PROJECT NO.: Mariner's Outlook | **PAGE: 1 of 1**
CONTRACTOR: N/A | **SURFACE ELEV.: N/A**
SAMPLE METHOD: Grab | **LOCATION: Sequim, WA**

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
			Organic topsoil			
			Light brown silty sand with gravel (medium dense, moist)			
1						
2						
			-Roots encountered up to 3.0 feet			
3			Brown poorly graded sand with gravel (dense, moist)			
4						
5						
6				S-1	G	
7			End of Exploratory Test Pit			
8						
9						
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-11

PROJECT: 10221014 | **DATE: 5/12/21**
PROJECT NO.: Mariner's Outlook | **PAGE: 1 of 1**
CONTRACTOR: N/A | **SURFACE ELEV.: N/A**
SAMPLE METHOD: Grab | **LOCATION: Sequim, WA**

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
			Organic topsoil			
			Light brown silty sand with gravel (medium dense, moist)			
2			-Roots encountered up to 2.5 feet	S-1	G	
			Brown silty sand (dense to very dense, moist)			
5			-Soil becomes very dense below 5.0 feet			
			End of Exploratory Test Pit			
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-12

PROJECT: 10221014 | **DATE: 5/12/21**
PROJECT NO.: Mariner's Outlook | **PAGE: 1 of 1**
CONTRACTOR: N/A | **SURFACE ELEV.: N/A**
SAMPLE METHOD: Grab | **LOCATION: Sequim, WA**

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
0			Organic topsoil			
			Light brown silty sand with gravel (medium dense, moist)			
1						
2			-Roots encountered up to 2.5 feet	S-1	G	
			Grayish brown poorly graded sand with silt and gravel (dense, moist)			
3						
			-Lense of sand encountered at 4.0 feet			
4			Grayish brown silty sand (very dense, moist)			
5						
6			End of Exploratory Test Pit			
7						
8						
9						
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-13

PROJECT: 10221014
PROJECT NO.: Mariner's Outlook
CONTRACTOR: N/A
SAMPLE METHOD: Grab

DATE: 5/12/21
PAGE: 1 of 1
SURFACE ELEV.: N/A
LOCATION: Sequim, WA

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits ■ 10 20 30 40 50 60 70 80 ■
			Organic topsoil			
			Light brown silty sand with gravel (medium dense, moist)			
1						
2			-Roots encountered up to 3.0 feet			
3			Grayish brown silty sand (very dense, moist)			
4						
			End of Exploratory Test Pit			
5						
6						
7						
8						
9						
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-14

PROJECT: 10221014
PROJECT NO.: Mariner's Outlook
CONTRACTOR: N/A
SAMPLE METHOD: Grab

DATE: 5/12/21
PAGE: 1 of 1
SURFACE ELEV.: N/A
LOCATION: Sequim, WA

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits 10 20 30 40 50 60 70 80
			Organic topsoil			
			Light brown silty sand with gravel (medium dense, moist)			
2			Grayish brown sandy silt (very stiff, moist)	S-1	G	
5			Brown poorly graded sand with silt (dense, moist)	S-2	G	
8			End of Exploratory Test Pit			

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-15

PROJECT: 10221014 | **DATE: 5/13/21**
PROJECT NO.: Mariner's Outlook | **PAGE: 1 of 1**
CONTRACTOR: N/A | **SURFACE ELEV.: N/A**
SAMPLE METHOD: Grab | **LOCATION: Sequim, WA**

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
			Organic topsoil			
			Light brown silty sand with gravel (medium dense, moist)			
3			Brown poorly graded gravel with silt and sand (dense, moist)	S-1	G	
6			-Soil becomes sandier below 6.5 feet	S-2	G	
8			End of Exploratory Test Pit			
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-16

PROJECT: 10221014
PROJECT NO.: Mariner's Outlook
CONTRACTOR: N/A
SAMPLE METHOD: Grab

DATE: 5/13/21
PAGE: 1 of 1
SURFACE ELEV.: N/A
LOCATION: Sequim, WA

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
0			Organic topsoil			
			Light brown silty sand with gravel (medium dense, moist)			
1						
2						
			-Roots encountered up to 3.0 feet			
3			Brown well graded gravel with silt and sand (dense, moist)			
4						
5				S-1	G	
6			-Soil becomes sandier below 6.0 feet			
7						
8						
			End of Exploratory Test Pit			
9						
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-17

PROJECT: 10221014
PROJECT NO.: Mariner's Outlook
CONTRACTOR: N/A
SAMPLE METHOD: Grab

DATE: 5/13/21
PAGE: 1 of 1
SURFACE ELEV.: N/A
LOCATION: Sequim, WA

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits 10 20 30 40 50 60 70 80
0			Organic topsoil			
1			Light brown silty sand with gravel (medium dense, moist)			
2			-Roots encountered up to 2.5 feet			
3			Brown silty sand (medium dense, moist)			
4						
5			Brown poorly graded sand with gravel (dense, moist)			
6						
7						
8						
9			End of Exploratory Test Pit			
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-18

PROJECT: 10221014
PROJECT NO.: Mariner's Outlook
CONTRACTOR: N/A
SAMPLE METHOD: Grab

DATE: 5/13/21
PAGE: 1 of 1
SURFACE ELEV.: N/A
LOCATION: Sequim, WA

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits 10 20 30 40 50 60 70 80
0			Organic topsoil			
			Light brown silty sand with gravel (medium dense, moist)			
3				S-1	G	
4			Brown poorly graded sand with gravel (dense, moist)			
8			End of Exploratory Test Pit			
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-19

PROJECT: 10221014
PROJECT NO.: Mariner's Outlook
CONTRACTOR: N/A
SAMPLE METHOD: Grab

DATE: 5/13/21
PAGE: 1 of 1
SURFACE ELEV.: N/A
LOCATION: Sequim, WA

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
0			Organic topsoil			
			Light brown silty sand with gravel (medium dense, moist)			
2				S-1	G	
4			Brown sandy silt (very stiff, moist)			
5				S-2	G	
8			End of Exploratory Test Pit			
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT TP-20

PROJECT: 10221014 | **DATE: 5/13/21**
PROJECT NO.: Mariner's Outlook | **PAGE: 1 of 1**
CONTRACTOR: N/A | **SURFACE ELEV.: N/A**
SAMPLE METHOD: Grab | **LOCATION: Sequim, WA**

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
0			Organic topsoil			
			Light brown silty sand with gravel (medium dense, moist)			
1						
2						
3			-Roots encountered up to 4.0 feet			
4			Brown poorly graded sand with gravel (medium dense to dense, moist)	S-1	G	
5						
6						
7			-Soil becomes dense and sandier below 7.0 feet			
8			End of Exploratory Test Pit			
9						
10						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT INF-1

PROJECT: 10221014
PROJECT NO.: Mariner's Outlook
CONTRACTOR: N/A
SAMPLE METHOD: Grab

DATE: 6/29/21
PAGE: 1 of 1
SURFACE ELEV.: ~155'
LOCATION: Sequim, WA

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
0			Organic topsoil			
1			Light brown silty sand with gravel (medium dense, moist)			
2						
3						
4			Brown sand with silt and gravel (dense, moist)			
5				S-1	G	
6						
7						
8						
9				S-2	G	
10			End of Exploratory Test Pit			
11						
12						
13						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered. Infiltration testing was performed at 5.5 feet.

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT INF-2

PROJECT: 10221014
PROJECT NO.: Mariner's Outlook
CONTRACTOR: N/A
SAMPLE METHOD: Grab

DATE: 6/29/21
PAGE: 1 of 1
SURFACE ELEV.: ~150'
LOCATION: Sequim, WA

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits 10 20 30 40 50 60 70 80
0			Organic topsoil			
1			Light brown silty sand with gravel (medium dense, moist)			
2						
3						
4			Brown sand with silt and gravel (dense, moist)			
5						
6				S-1	G	
7						
8						
9				S-2	G	
			End of Exploratory Test Pit			
10						
11						
12						
13						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered. Infiltration testing was performed at 6.0 feet

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT INF-3

PROJECT: 10221014 | **DATE: 6/30/21**
PROJECT NO.: Mariner's Outlook | **PAGE: 1 of 1**
CONTRACTOR: N/A | **SURFACE ELEV.: ~140'**
SAMPLE METHOD: Grab | **LOCATION: Sequim, WA**

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
0			Organic topsoil			
1			Light brown silty sand with gravel (medium dense, moist)			
3			Brown sand with gravel (dense, moist)			
8				S-1	G	
9			-One foot layer of silty sand encountered at 9.0 feet			
12			End of Exploratory Test Pit			
13						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered. Infiltration testing was performed at 8.0 feet

Logged By: EB

KRAZAN AND ASSOCIATES, INC.

LOG OF EXPLORATORY TEST PIT INF-4

PROJECT: 10221014
PROJECT NO.: Mariner's Outlook
CONTRACTOR: N/A
SAMPLE METHOD: Grab

DATE: 7/1/21
PAGE: 1 of 1
SURFACE ELEV.: ~155'
LOCATION: Sequim, WA

DEPTH (ft)	USC SYMBOL	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE No.	SAMPLE TYPE	Moisture Content and Atterberg Limits (10 20 30 40 50 60 70 80)
0			Organic topsoil			
1			Light brown silty sand with gravel (medium dense, moist)			
2						
3			Brown sand with silt and gravel (dense, moist)			
4						
5						
6				S-1	G	
7						
8						
9				S-2	G	
			End of Exploratory Test Pit			
10						
11						
12						
13						

Water Level Initial: ▽ Final: ▼

Water Observations: Groundwater seepage was not encountered

Notes: Caving was not encountered. Infiltration testing was performed at 6.0 feet

Logged By: EB

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May 17, 2021 KA Project No.: 10221014

Tracy Gudgel
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Email: tracy@zenovic.net

Project Information

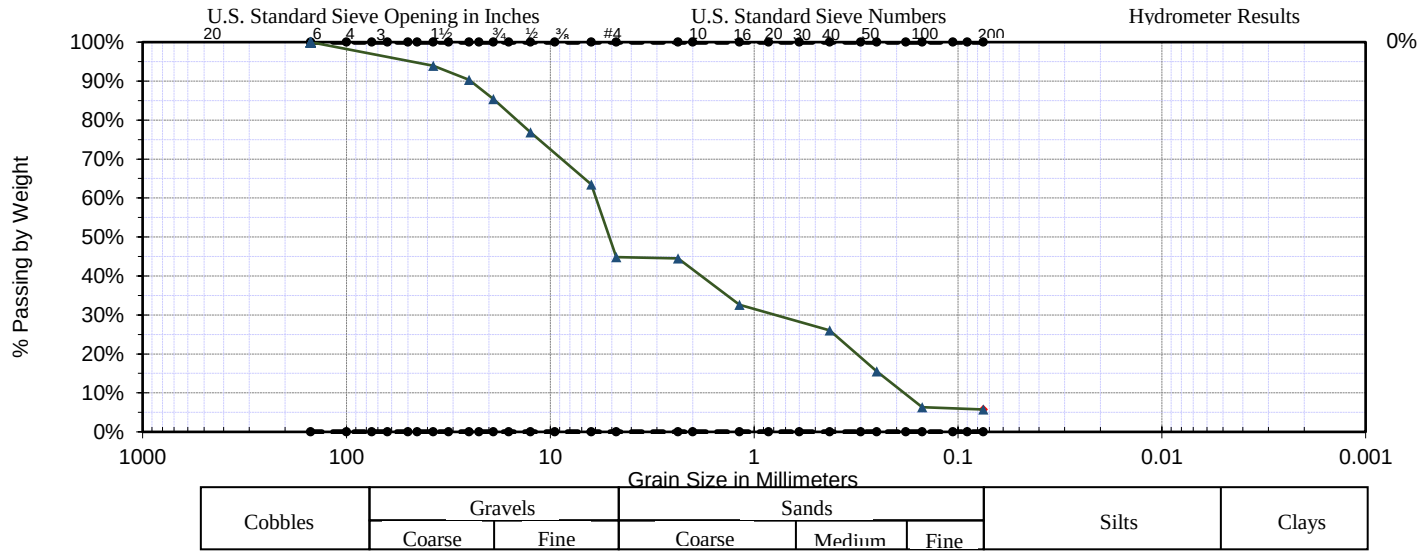
Project Name:	Proposed Mariners Outlook - Phase III		
Address	APNs: 03-30-27-239050, -249080,-210180,-2101	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim	Bldg. Permit No.:	N/A

Sample Information

KA Sample No.:	**Y0086**		
Date Sampled:	May 13, 2021	Sampled By:	EB
Date Received:	May 14, 2021	Proposed Use:	Geotechnical
Sample Description:	GP-GM, Poorly graded Gravel with Silt and Sand		
Sample Source:	Native	Elev./Depth:	-6.0'
Sample Location:	TP 15		
Project Specification:	N/A	Client Notes:	N/A
Date Tested:	May 17, 2021	Tested By:	Aaron Clyde

ASTM D6913

Standard Test Method for Particle Distribution of Soil Using Sieve Analysis



Coarse Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
6.00"			
4.00"			
3.00"			
2.50"			
2.00"			
1.75"			
1.50"	94		
1.25"			
1.00"	90		
7/8"			
3/4"	85		
5/8"			
1/2"	77		
3/8"			
1/4"	64		

Fine Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
#4	45		
#8	45		
#10			
#16	33		
#20			
#30			
#40	26		
#50			
#60	16		
#80			
#100	6		
#140			
#170			
#200	5.7		
#270			

USCS Classification

D_{10} =	0.190
D_{30} =	0.877
D_{60} =	6.008
C_C =	0.67
$C_{U=}$	31.63
Liquid Limit=	
Plastic Limit=	
Plasticity Index=	
Dust Ratio=	0.22
Fineness Modulus	4.76
% Moisture:	5.2
% Gravel	55.1
% Sand	39.1
% Silt/Clay	5.7
USCS Classification	GP-GM, Poorly graded Gravel with Silt and Sand

AASHTO ACCREDITED

Notes: N/A

Reviewed By:

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May 24, 2021 KA Project No.: 10221014

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Project Information

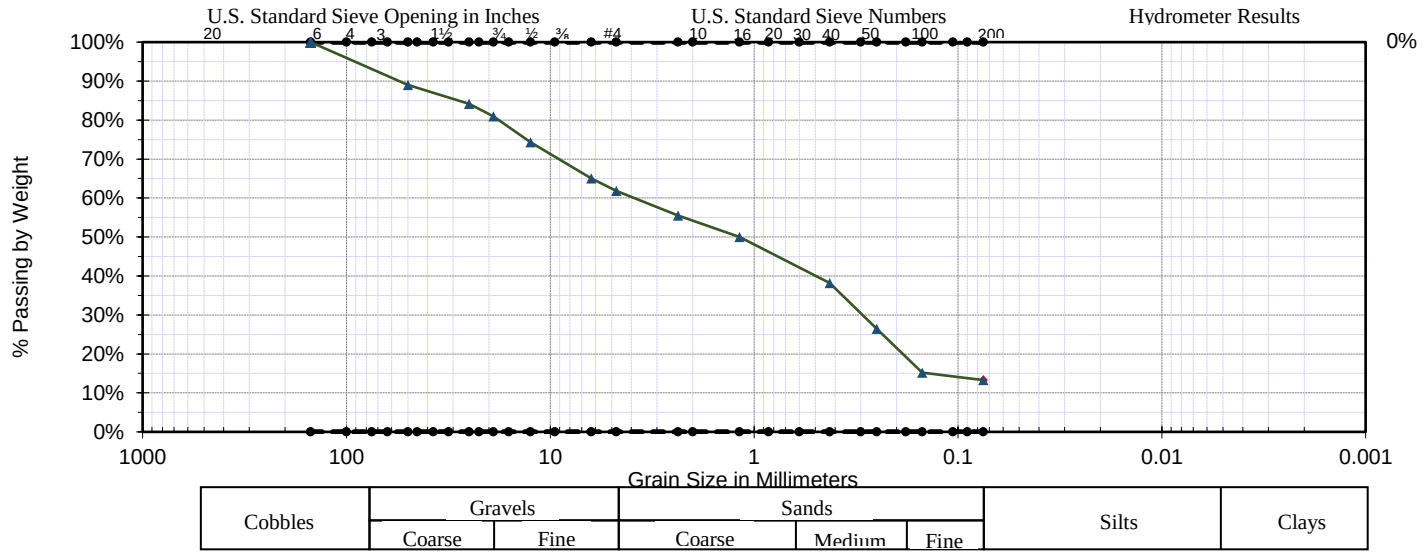
Project Name:	Proposed Mariners Outlook - Phase III		
Address	APNs: 03-30-27-239050, -249080,-210180,-2101	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim	Bldg. Permit No.:	N/A

Sample Information

KA Sample No.:	**Y0079**		
Date Sampled:	April 21, 2021	Sampled By:	WM/VF
Date Received:	May 14, 2021	Proposed Use:	Geotechnical
Sample Description:	SM, Silty Sand with Gravel		
Sample Source:	Native	Elev./Depth:	-4.0'
Sample Location:	TP - 1		
Project Specification:	N/A	Client Notes:	N/A
Date Tested:	May 17, 2021	Tested By:	Aaron Clyde

ASTM D6913

Standard Test Method for Particle Distribution of Soil Using Sieve Analysis



Coarse Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
6.00"			
4.00"			
3.00"			
2.50"			
2.00"	89		
1.75"			
1.50"			
1.25"			
1.00"	84		
7/8"			
3/4"	81		
5/8"			
1/2"	74		
3/8"			
1/4"	65		

Fine Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
#4	62		
#8	55		
#10			
#16	50		
#20			
#30			
#40	38		
#50			
#60	26		
#80			
#100	15		
#140			
#170			
#200	13.3		
#270			

USCS Classification

D_{10} =	0.056
D_{30} =	0.302
D_{60} =	4.058
C_C =	0.40
C_U =	71.87
Liquid Limit=	
Plastic Limit=	
Plasticity Index=	
Dust Ratio=	0.35
Fineness Modulus	4.09
% Moisture:	11.1
% Gravel	38.2
% Sand	48.6
% Silt/Clay	13.3
USCS Classification	SM, Silty Sand with Gravel

AASHTO ACCREDITED

Notes: N/A

Reviewed By:

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May 24, 2021 KA Project No.: 10221014

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Project Information

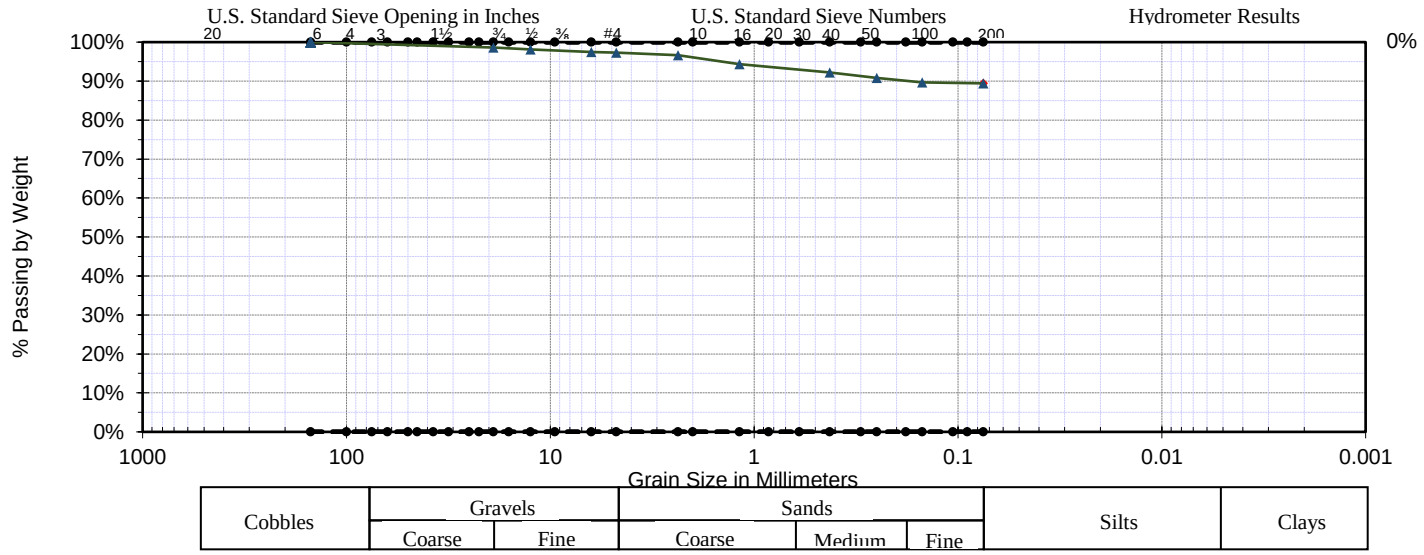
Project Name:	Proposed Mariners Outlook - Phase III		
Address	APNs: 03-30-27-239050, -249080,-210180,-2101	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim	Bldg. Permit No.:	N/A

Sample Information

KA Sample No.:	**Y0080**		
Date Sampled:	April 21, 2021	Sampled By:	WM/VF
Date Received:	May 14, 2021	Proposed Use:	Geotechnical
Sample Description:	ML, Silt		
Sample Source:	Native	Elev./Depth:	-5.0'
Sample Location:	TP - 3		
Project Specification:	N/A	Client Notes:	N/A
Date Tested:	May 17, 2021	Tested By:	Aaron Clyde

ASTM D6913

Standard Test Method for Particle Distribution of Soil Using Sieve Analysis



Coarse Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
6.00"			
4.00"			
3.00"			
2.50"			
2.00"			
1.75"			
1.50"			
1.25"			
1.00"			
7/8"			
3/4"	99		
5/8"			
1/2"	98		
3/8"			
1/4"	97		

Fine Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
#4	97		
#8	97		
#10			
#16	94		
#20			
#30			
#40	92		
#50			
#60	91		
#80			
#100	90		
#140			
#170			
#200	89.4		
#270			

USCS Classification

D_{10} =	0.008
D_{30} =	0.025
D_{60} =	0.050
C_C =	1.50
C_U =	6.00
Liquid Limit=	
Plastic Limit=	
Plasticity Index=	
Dust Ratio=	0.97
Fineness Modulus	0.42
% Moisture:	20.6
% Gravel	2.7
% Sand	7.9
% Silt/Clay	89.4
USCS Classification	ML, Silt

AASHTO ACCREDITED

Notes: N/A

Reviewed By:

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May 24, 2021 KA Project No.: 10221014

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Project Information

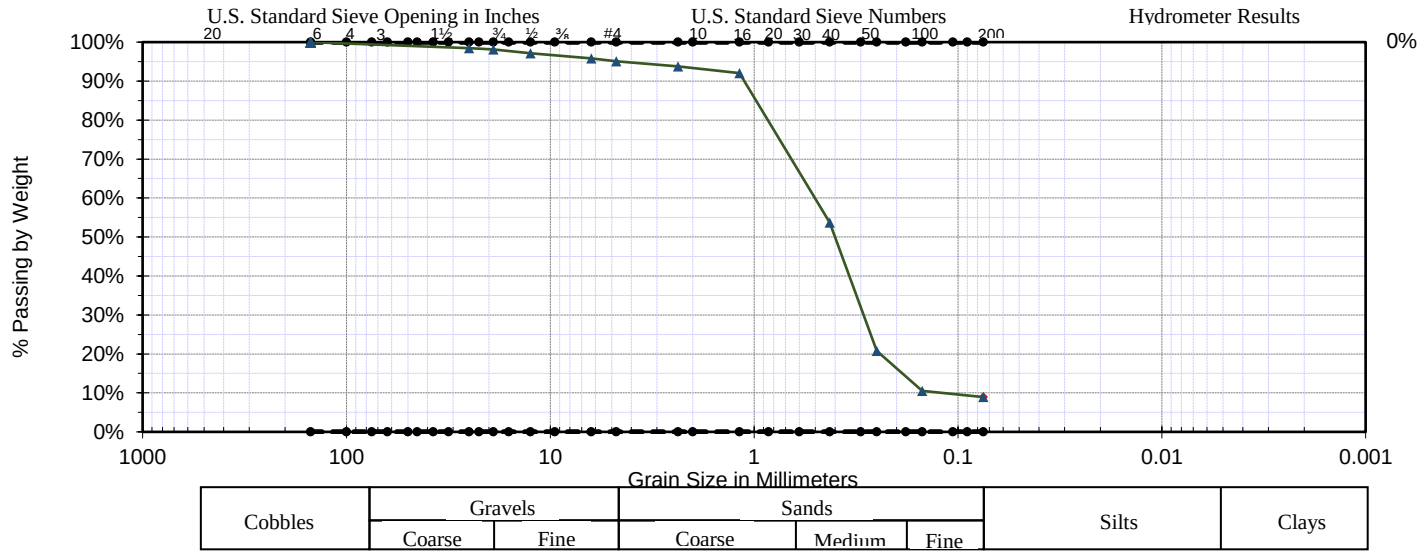
Project Name:	Proposed Mariners Outlook - Phase III		
Address	APNs: 03-30-27-239050, -249080,-210180,-2101	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim	Bldg. Permit No.:	N/A

Sample Information

KA Sample No.:	**Y0081**		
Date Sampled:	April 21, 2021	Sampled By:	WM/VF
Date Received:	May 14, 2021	Proposed Use:	Geotechnical
Sample Description:	SP-SM, Poorly graded Sand with Silt		
Sample Source:	Native	Elev./Depth:	-3.5'
Sample Location:	TP - 5		
Project Specification:	N/A	Client Notes:	N/A
Date Tested:	May 17, 2021	Tested By:	Aaron Clyde

ASTM D6913

Standard Test Method for Particle Distribution of Soil Using Sieve Analysis



Coarse Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
6.00"			
4.00"			
3.00"			
2.50"			
2.00"			
1.75"			
1.50"			
1.25"			
1.00"	98		
7/8"			
3/4"	98		
5/8"			
1/2"	97		
3/8"			
1/4"	96		

Fine Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
#4	95		
#8	94		
#10			
#16	92		
#20			
#30			
#40	54		
#50			
#60	21		
#80			
#100	11		
#140			
#170			
#200	8.9		
#270			

USCS Classification

D_{10} =	0.124
D_{30} =	0.299
D_{60} =	0.549
C_C =	1.31
C_U =	4.41
Liquid Limit=	
Plastic Limit=	
Plasticity Index=	
Dust Ratio=	0.17
Fineness Modulus	2.21
% Moisture:	5.0
% Gravel	4.9
% Sand	86.2
% Silt/Clay	8.9
USCS Classification	SP-SM, Poorly graded Sand with Silt

AASHTO ACCREDITED

Notes: N/A

Reviewed By:

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May 25, 2021 KA Project No.: 10221014

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Project Information

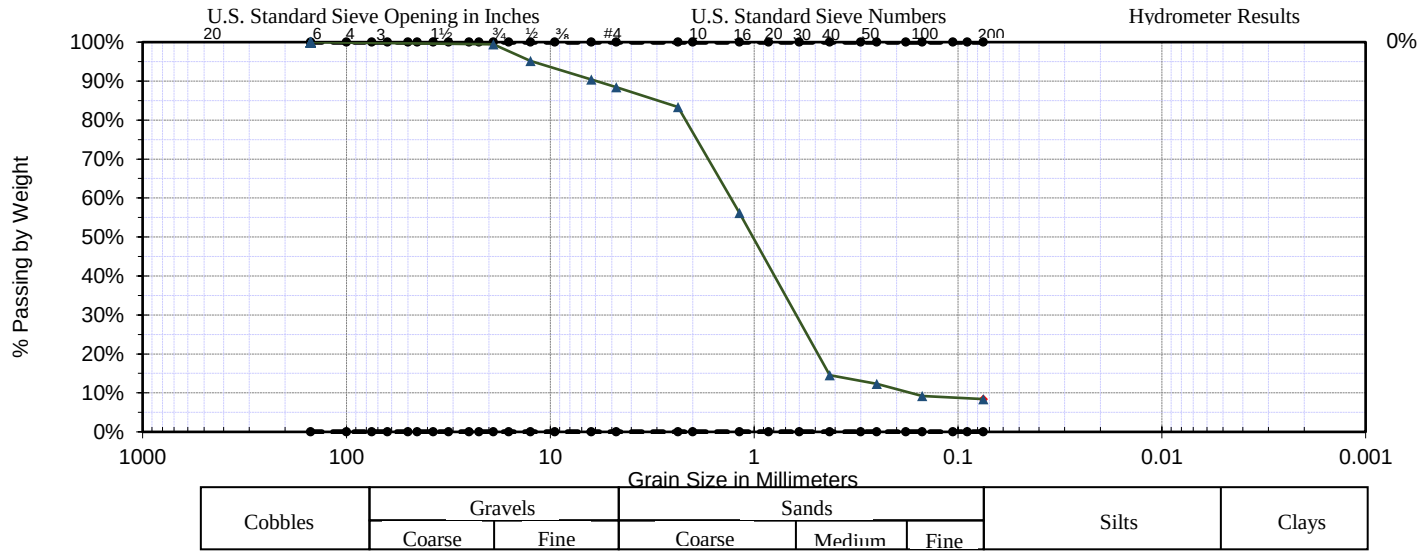
Project Name:	Proposed Mariners Outlook - Phase III		
Address	APNs: 03-30-27-239050, -249080,-210180,-2101	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim	Bldg. Permit No.:	N/A

Sample Information

KA Sample No.:	**Y0082**		
Date Sampled:	April 21, 2021	Sampled By:	WM/VF
Date Received:	May 14, 2021	Proposed Use:	Geotechnical
Sample Description:	SW-SM, Well-graded Sand with Silt		
Sample Source:	Native	Elev./Depth:	-7.0'
Sample Location:	TP-6		
Project Specification:	N/A	Client Notes:	N/A
Date Tested:	May 17, 2021	Tested By:	Aaron Clyde

ASTM D6913

Standard Test Method for Particle Distribution of Soil Using Sieve Analysis



Coarse Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
6.00"			
4.00"			
3.00"			
2.50"			
2.00"			
1.75"			
1.50"			
1.25"			
1.00"			
7/8"			
3/4"	99		
5/8"			
1/2"	95		
3/8"			
1/4"	90		

Fine Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
#4	88		
#8	83		
#10			
#16	56		
#20			
#30			
#40	15		
#50			
#60	12		
#80			
#100	9		
#140			
#170			
#200	8.4		
#270			

USCS Classification

D_{10} =	0.176
D_{30} =	0.705
D_{60} =	1.347
C_C =	2.10
C_U =	7.66
Liquid Limit=	
Plastic Limit=	
Plasticity Index=	
Dust Ratio=	0.58
Fineness Modulus	3.33
% Moisture:	5.3
% Gravel	11.6
% Sand	80.0
% Silt/Clay	8.4
USCS Classification	SW-SM, Well-graded Sand with Silt

AASHTO ACCREDITED

Notes: N/A

Reviewed By:

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May 24, 2021 KA Project No.: 10221014

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Project Information

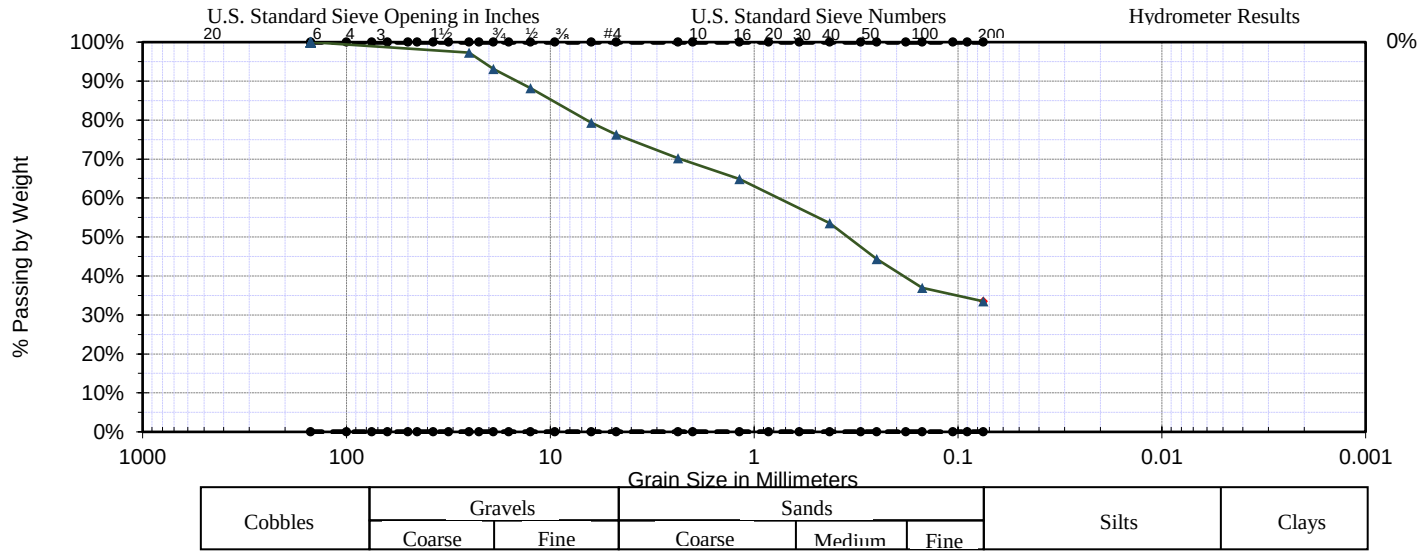
Project Name:	Proposed Mariners Outlook - Phase III		
Address	APNs: 03-30-27-239050, -249080,-210180,-2101	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim	Bldg. Permit No.:	N/A

Sample Information

KA Sample No.:	**Y0083**		
Date Sampled:	May 12, 2021	Sampled By:	EB
Date Received:	May 14, 2021	Proposed Use:	Geotechnical
Sample Description:	SM, Silty Sand with Gravel		
Sample Source:	Native	Elev./Depth:	-2.0'
Sample Location:	TP 8		
Project Specification:	N/A	Client Notes:	N/A
Date Tested:	May 17, 2021	Tested By:	Aaron Clyde

ASTM D6913

Standard Test Method for Particle Distribution of Soil Using Sieve Analysis



Coarse Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
6.00"			
4.00"			
3.00"			
2.50"			
2.00"			
1.75"			
1.50"			
1.25"			
1.00"	97		
7/8"			
3/4"	93		
5/8"			
1/2"	88		
3/8"			
1/4"	79		

Fine Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
#4	76		
#8	70		
#10			
#16	65		
#20			
#30			
#40	54		
#50			
#60	44		
#80			
#100	37		
#140			
#170			
#200	33.5		
#270			

USCS Classification

D_{10} =	0.022
D_{30} =	0.067
D_{60} =	0.855
C_C =	0.24
C_U =	38.17
Liquid Limit=	
Plastic Limit=	
Plasticity Index=	
Dust Ratio=	0.63
Fineness Modulus	2.71
% Moisture:	4.8
% Gravel	23.7
% Sand	42.8
% Silt/Clay	33.5
USCS Classification	SM, Silty Sand with Gravel

AASHTO ACCREDITED

Notes: N/A

Reviewed By:

Krazan and Associates
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May 24, 2021 KA Project No.: 10221014

Tracy Gudgel
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6676 Gunpark Dr. Ste D
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Email: tracy@zenovic.net

Project Information

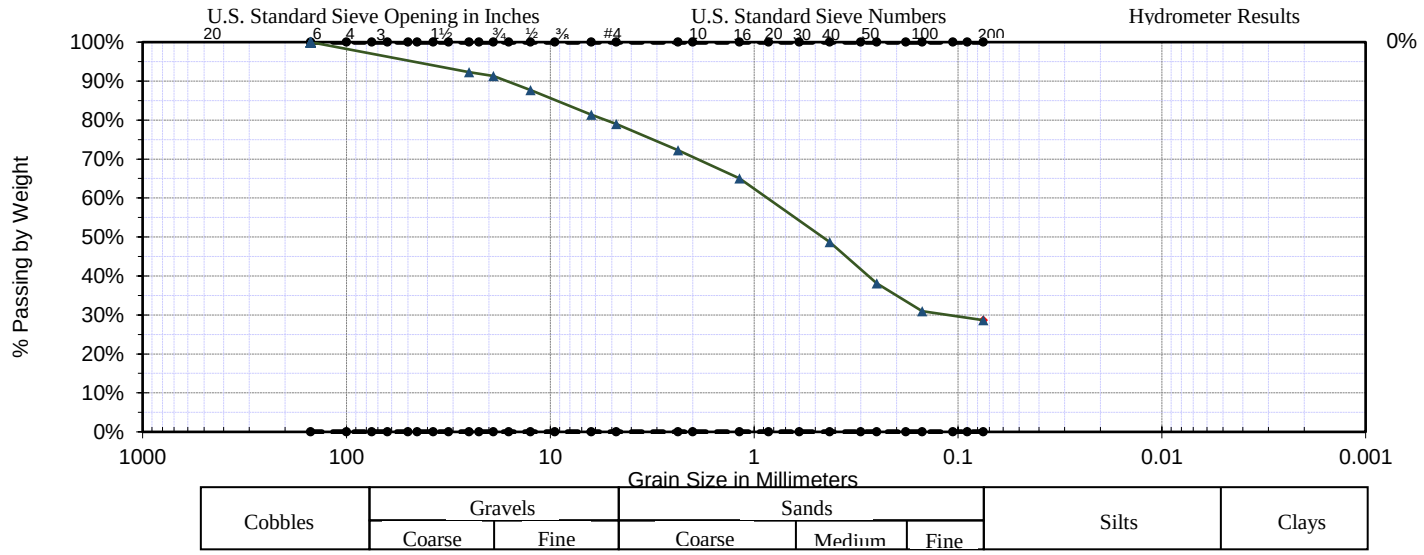
Project Name:	Proposed Mariners Outlook - Phase III		
Address	APNs: 03-30-27-239050, -249080,-210180,-2101	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim	Bldg. Permit No.:	N/A

Sample Information

KA Sample No.:	**Y0084**		
Date Sampled:	May 12, 2021	Sampled By:	EB
Date Received:	May 14, 2021	Proposed Use:	Geotechnical
Sample Description:	SM, Silty Sand with Gravel		
Sample Source:	Native	Elev./Depth:	-2.5'
Sample Location:	TP - 11		
Project Specification:	N/A	Client Notes:	N/A
Date Tested:	May 17, 2021	Tested By:	Aaron Clyde

ASTM D6913

Standard Test Method for Particle Distribution of Soil Using Sieve Analysis



Coarse Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
6.00"			
4.00"			
3.00"			
2.50"			
2.00"			
1.75"			
1.50"			
1.25"			
1.00"	92		
7/8"			
3/4"	91		
5/8"			
1/2"	88		
3/8"			
1/4"	81		

Fine Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
#4	79		
#8	72		
#10			
#16	65		
#20			
#30			
#40	49		
#50			
#60	38		
#80			
#100	31		
#140			
#170			
#200	28.7		
#270			

USCS Classification

D_{10} =	0.026
D_{30} =	0.119
D_{60} =	0.946
C_C =	0.57
C_U =	36.15
Liquid Limit=	
Plastic Limit=	
Plasticity Index=	
Dust Ratio=	0.59
Fineness Modulus	2.83
% Moisture:	7.2
% Gravel	21.0
% Sand	50.3
% Silt/Clay	28.7
USCS Classification	SM, Silty Sand with Gravel

AASHTO ACCREDITED

Notes: N/A

Reviewed By:

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Project Information

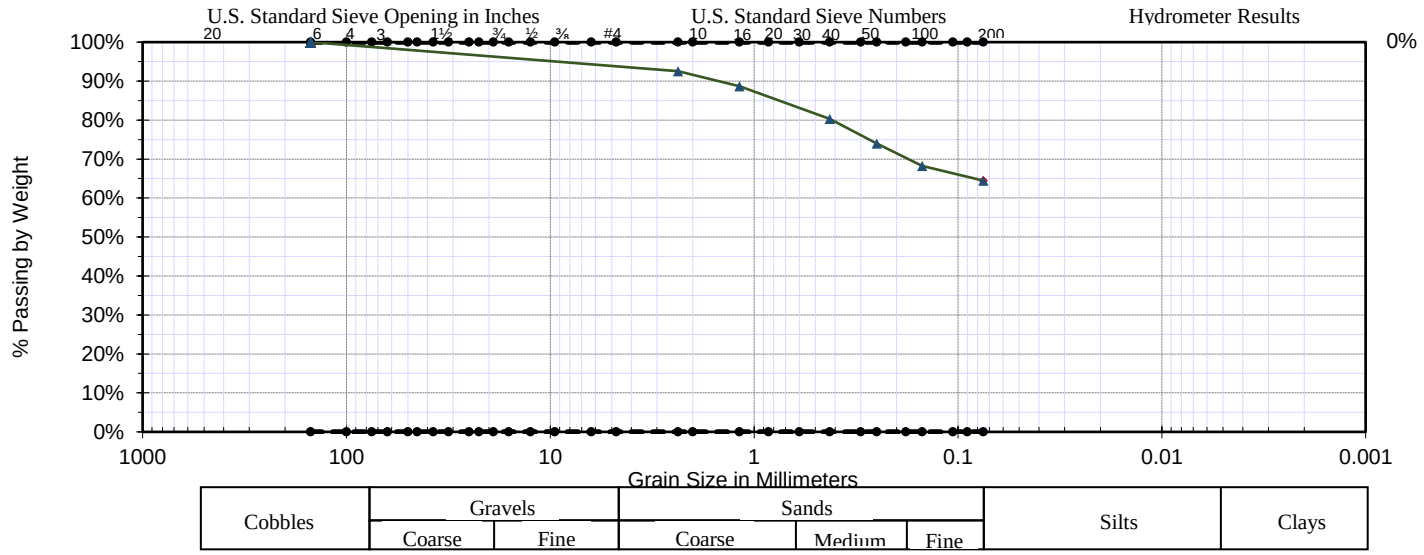
Project Name:	Proposed Mariners Outlook - Phase III		
Address	APNs: 03-30-27-239050, -249080,-210180,-2101	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim	Bldg. Permit No.:	N/A

Sample Information

KA Sample No.:	**Y0085**		
Date Sampled:	May 12, 2021	Sampled By:	EB
Date Received:	May 14, 2021	Proposed Use:	Geotechnical
Sample Description:	ML, Sandy Silt		
Sample Source:	Native	Elev./Depth:	-2.5'
Sample Location:	TP - 14		
Project Specification:	N/A	Client Notes:	N/A
Date Tested:	May 17, 2021	Tested By:	Aaron Clyde

ASTM D6913

Standard Test Method for Particle Distribution of Soil Using Sieve Analysis



Coarse Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
6.00"			
4.00"			
3.00"			
2.50"			
2.00"			
1.75"			
1.50"			
1.25"			
1.00"			
7/8"			
3/4"			
5/8"			
1/2"			
3/8"			
1/4"			

Fine Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
#4			
#8	93		
#10			
#16	89		
#20			
#30			
#40	80		
#50			
#60	74		
#80			
#100	68		
#140			
#170			
#200	64.5		
#270			

USCS Classification

D_{10} =	0.012
D_{30} =	0.035
D_{60} =	0.070
C_C =	1.50
C_U =	6.00
Liquid Limit=	
Plastic Limit=	
Plasticity Index=	
Dust Ratio=	0.80
Fineness Modulus	0.93
% Moisture:	19.5
% Gravel	0.0
% Sand	35.5
% Silt/Clay	64.5
USCS Classification	ML, Sandy Silt

AASHTO ACCREDITED

Notes: N/A

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May 24, 2021 KA Project No.: 10221014

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Email: tracy@zenovic.net

Project Information

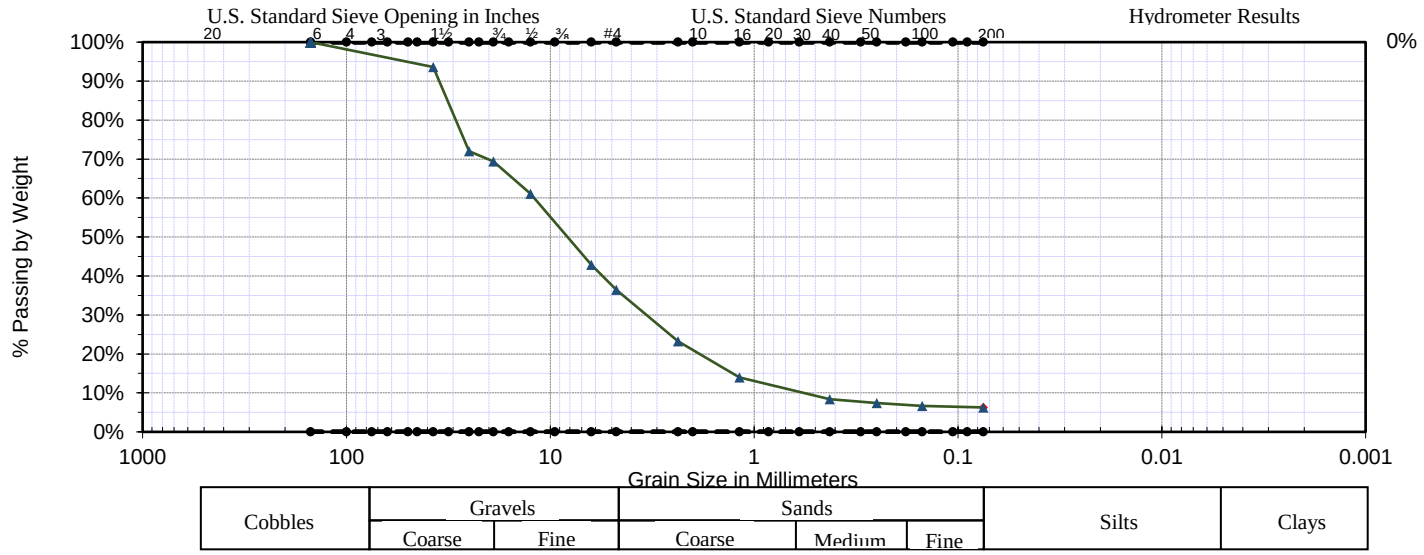
Project Name:	Proposed Mariners Outlook - Phase III		
Address	APNs: 03-30-27-239050, -249080,-210180,-2101	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim	Bldg. Permit No.:	N/A

Sample Information

KA Sample No.:	**Y0087**		
Date Sampled:	May 13, 2021	Sampled By:	EB
Date Received:	May 14, 2021	Proposed Use:	Geotechnical
Sample Description:	GW-GM, Well-graded Gravel with Silt and Sand		
Sample Source:	Native	Elev./Depth:	-5.0'
Sample Location:	TP 16		
Project Specification:	N/A	Client Notes:	N/A
Date Tested:	May 17, 2021	Tested By:	Aaron Clyde

ASTM D6913

Standard Test Method for Particle Distribution of Soil Using Sieve Analysis



Coarse Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
6.00"			
4.00"			
3.00"			
2.50"			
2.00"			
1.75"			
1.50"	94		
1.25"			
1.00"	72		
7/8"			
3/4"	69		
5/8"			
1/2"	61		
3/8"			
1/4"	43		

Fine Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
#4	36		
#8	23		
#10			
#16	14		
#20			
#30			
#40	8		
#50			
#60	7		
#80			
#100	7		
#140			
#170			
#200	6.3		
#270			

USCS Classification

D_{10} =	0.643
D_{30} =	3.579
D_{60} =	12.131
C_C =	1.64
C_U =	18.88
Liquid Limit=	
Plastic Limit=	
Plasticity Index=	
Dust Ratio=	0.75
Fineness Modulus	5.87
% Moisture:	3.4
% Gravel	63.5
% Sand	30.2
% Silt/Clay	6.3
USCS Classification	GW-GM, Well-graded Gravel with Silt and Sand

AASHTO ACCREDITED

Notes: N/A

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May 24, 2021 KA Project No.: 10221014

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Project Information

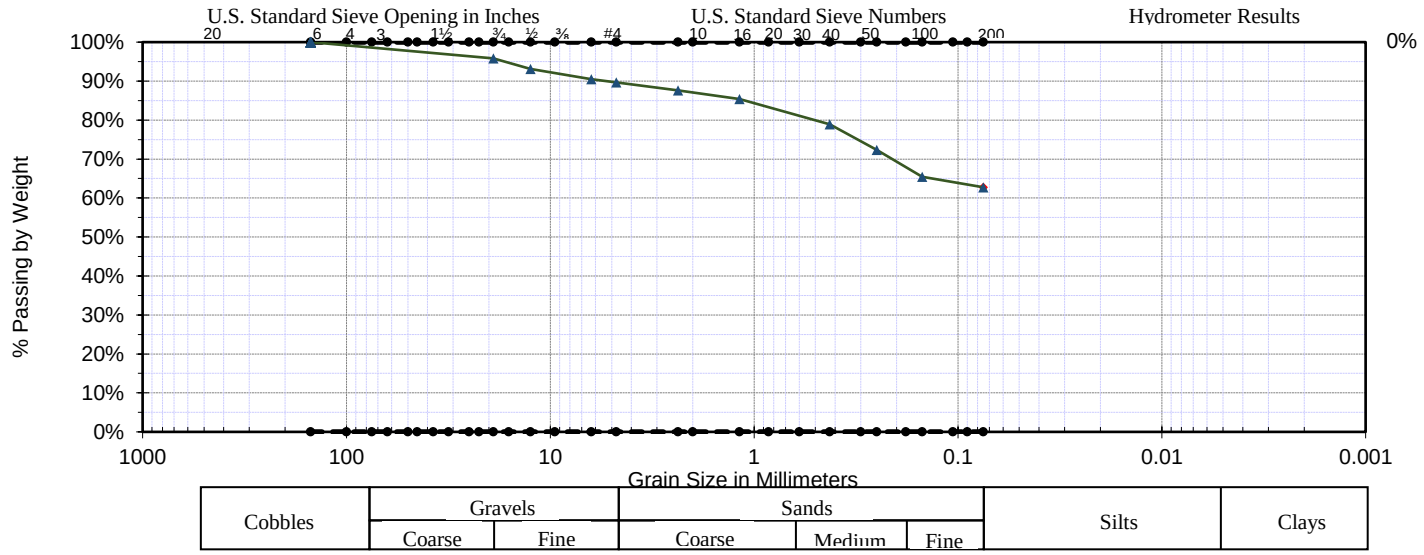
Project Name:	Proposed Mariners Outlook - Phase III		
Address	APNs: 03-30-27-239050, -249080,-210180,-2101	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim	Bldg. Permit No.:	N/A

Sample Information

KA Sample No.:	**Y0088**		
Date Sampled:	May 13, 2021	Sampled By:	EB
Date Received:	May 14, 2021	Proposed Use:	Geotechnical
Sample Description:	ML, Sandy Silt		
Sample Source:	Native	Elev./Depth:	-5.0'
Sample Location:	TP - 19		
Project Specification:	N/A	Client Notes:	N/A
Date Tested:	May 17, 2021	Tested By:	Aaron Clyde

ASTM D6913

Standard Test Method for Particle Distribution of Soil Using Sieve Analysis



Coarse Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
6.00"			
4.00"			
3.00"			
2.50"			
2.00"			
1.75"			
1.50"			
1.25"			
1.00"			
7/8"			
3/4"	96		
5/8"			
1/2"	93		
3/8"			
1/4"	90		

Fine Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
#4	90		
#8	88		
#10			
#16	85		
#20			
#30			
#40	79		
#50			
#60	72		
#80			
#100	65		
#140			
#170			
#200	62.8		
#270			

USCS Classification

D_{10} =	0.012
D_{30} =	0.036
D_{60} =	0.072
C_C =	1.50
C_U =	6.00
Liquid Limit=	
Plastic Limit=	
Plasticity Index=	
Dust Ratio=	0.79
Fineness Modulus	1.29
% Moisture:	10.1
% Gravel	10.3
% Sand	26.9
% Silt/Clay	62.8
USCS Classification	ML, Sandy Silt

AASHTO ACCREDITED

Notes: N/A

Reviewed By:

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July 16, 2021 KA Project No.: 10221014

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Email: tracy@zenovic.net

Project Information

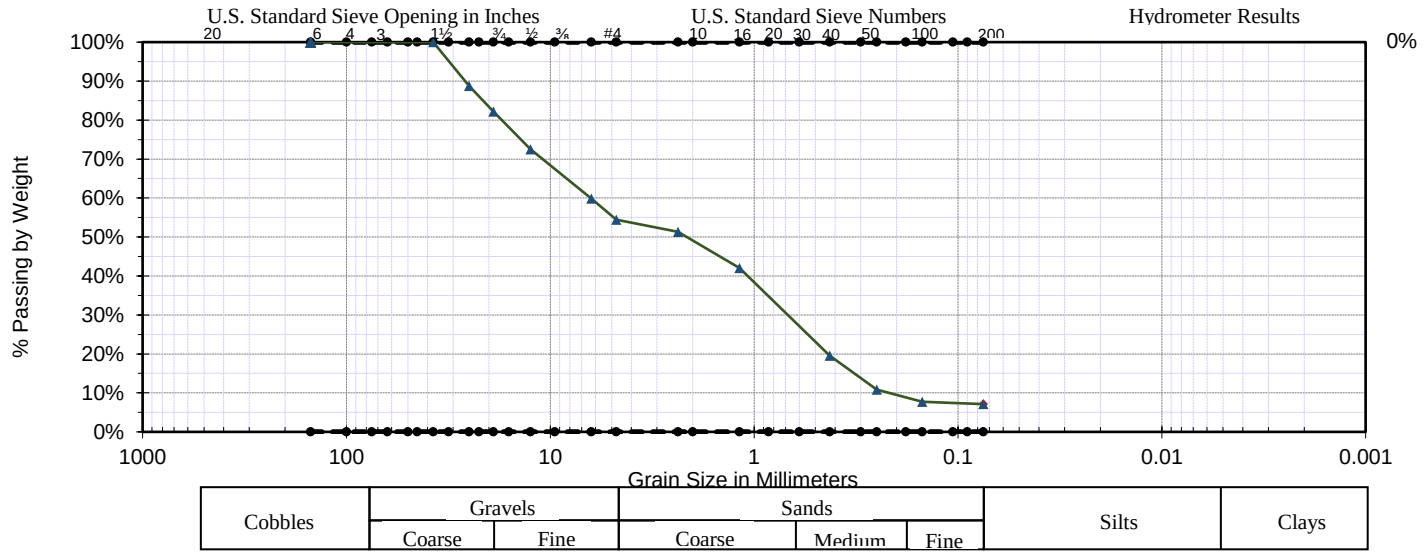
Project Name:	Proposed Mariners Outlook - Phase III		
Address	Mariners View Drive	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim	Bldg. Permit No.:	N/A

Sample Information

KA Sample No.:	**Y0157**		
Date Sampled:	June 30, 2021	Sampled By:	Elizabeth Basler
Date Received:	July 7, 2021	Proposed Use:	Infiltration
Sample Description:	SP-SM, Poorly graded Sand with Silt and Gravel		
Sample Source:	Native	Elev./Depth:	5.5'
Sample Location:	INF-1		
Project Specification:	N/A	Client Notes:	N/A
Date Tested:	July 13, 2021	Tested By:	Aaron Clyde

ASTM D6913

Standard Test Method for Particle Distribution of Soil Using Sieve Analysis



Coarse Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
6.00"			
4.00"			
3.00"			
2.50"			
2.00"			
1.75"			
1.50"	100%		
1.25"			
1.00"	89%		
7/8"			
3/4"	82%		
5/8"			
1/2"	73%		
3/8"			
1/4"	60%		

Fine Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
#4	54%		
#8	51%		
#10			
#16	42%		
#20			
#30			
#40	20%		
#50			
#60	11%		
#80			
#100	8%		
#140			
#170			
#200	7.1%		
#270			

USCS Classification

D_{10} =	0.223
D_{30} =	0.775
D_{60} =	6.378
C_C =	0.42
C_U =	28.64
Liquid Limit=	
Plastic Limit=	
Plasticity Index=	
Dust Ratio=	0.36
Fineness Modulus	4.58
% Moisture:	
% Gravel	45.6%
% Sand	47.3%
% Silt/Clay	7.1%
USCS Classification	SP-SM, Poorly graded Sand with Silt and Gravel

AASHTO ACCREDITED

Notes: N/A

Reviewed By: _____

Krazan

ASTM D2474-20e - Organic Content

July 16, 2021 KA Project No.: 10221014

Andrew Unkefer
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6676 Gunpark Dr. Ste D
Boulder, CO 80301

Project Information

Project Name:	Proposed Mariners Outlook - Phase III		
Address	Mariners View Drive	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim		
Building Permit No.:	N/A		

Sample Information

KA Sample No.:	**Y0157**		
Date Sampled:	June 30, 2021	Sampled By:	Elizabeth Basler
Date Received:	July 7, 2021	Proposed Use:	0
Sample Description:	SP-SM, Poorly graded Sand with Silt and Gravel		
Sample Source:	Native, INF-1	Elev./Depth:	5.5'
Project Specification:	N/A	Client Notes:	N/A

ASTM D2974

Standard Test Methods for Determining the Water (Moisture) Content, Ash Content, and Organic Material of Peat and Other Organic Soils

Test Results

Ash Content %	94.8	%
Organic Content %	**5.2**	**%**
As Received Moisture Content %	9.9	%
Furnace Temperature Used	110	F°

All test results are proportion of oven-dried mass.

Reviewed By

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July 16, 2021 KA Project No.: 10221014

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Email: tracy@zenovic.net

Project Information

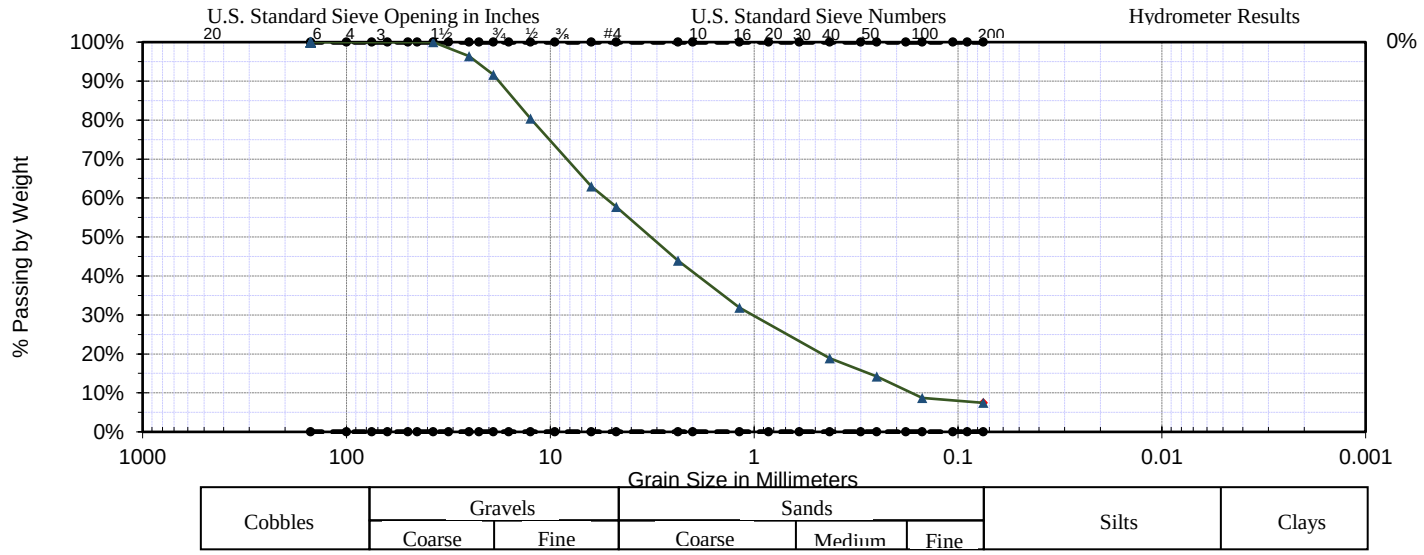
Project Name:	Proposed Mariners Outlook - Phase III		
Address	Mariners View Drive	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim	Bldg. Permit No.:	N/A

Sample Information

KA Sample No.:	**Y0158**		
Date Sampled:	June 30, 2021	Sampled By:	Elizabeth Basler
Date Received:	July 7, 2021	Proposed Use:	Infiltration
Sample Description:	SW-SM, Well-graded Sand with Silt and Gravel		
Sample Source:	Native	Elev./Depth:	5.5'
Sample Location:	INF-2		
Project Specification:	N/A	Client Notes:	N/A
Date Tested:	July 13, 2021	Tested By:	Aaron Clyde

ASTM D6913

Standard Test Method for Particle Distribution of Soil Using Sieve Analysis



Coarse Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
6.00"			
4.00"			
3.00"			
2.50"			
2.00"			
1.75"			
1.50"	100%		
1.25"			
1.00"	96%		
7/8"			
3/4"	92%		
5/8"			
1/2"	80%		
3/8"			
1/4"	63%		

Fine Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
#4	58%		
#8	44%		
#10			
#16	32%		
#20			
#30			
#40	19%		
#50			
#60	14%		
#80			
#100	9%		
#140			
#170			
#200	7.5%		
#270			

USCS Classification

D_{10} =	0.173
D_{30} =	1.072
D_{60} =	5.415
C_C =	1.23
C_U =	31.33
Liquid Limit=	
Plastic Limit=	
Plasticity Index=	
Dust Ratio=	0.39
Fineness Modulus	4.57
% Moisture:	
% Gravel	42.2%
% Sand	50.3%
% Silt/Clay	7.5%
USCS Classification	SW-SM, Well-graded Sand with Silt and Gravel

AASHTO ACCREDITED

Notes: N/A

Reviewed By: _____

Krazan

ASTM D2474-20e - Organic Content

July 16, 2021 KA Project No.: 10221014

Andrew Unkefer
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6676 Gunpark Dr. Ste D
Boulder, CO 80301

Project Information

Project Name:	Proposed Mariners Outlook - Phase III		
Address	Mariners View Drive	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim		
Building Permit No.:	N/A		

Sample Information

KA Sample No.:	**Y0158**		
Date Sampled:	June 30, 2021	Sampled By:	Elizabeth Basler
Date Received:	July 7, 2021	Proposed Use:	0
Sample Description:	SW-SM, Well-graded Sand with Silt and Gravel		
Sample Source:	Native, INF-2	Elev./Depth:	5.5'
Project Specification:	N/A	Client Notes:	N/A

ASTM D2974

Standard Test Methods for Determining the Water (Moisture) Content, Ash Content, and Organic Material of Peat and Other Organic Soils

Test Results

Ash Content %	99.3	%
Organic Content %	**0.7**	**%**
As Received Moisture Content %	18.1	%
Furnace Temperature Used	110	F°

All test results are proportion of oven-dried mass.

Reviewed By

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Email: tracy@zenovic.net

Project Information

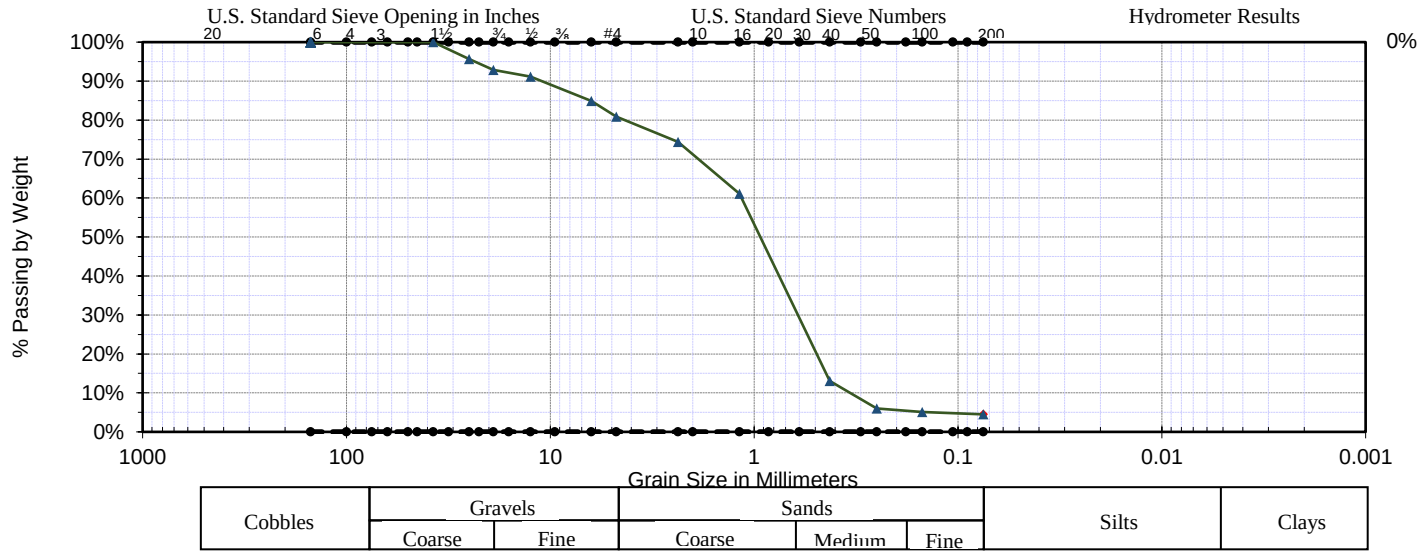
Project Name:	Proposed Mariners Outlook - Phase III		
Address	Mariners View Drive	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim	Bldg. Permit No.:	N/A

Sample Information

KA Sample No.:	**Y0159**		
Date Sampled:	July 1, 2021	Sampled By:	Elizabeth Basler
Date Received:	July 7, 2021	Proposed Use:	Infiltration
Sample Description:	SP, Poorly graded Sand with Gravel		
Sample Source:	Native	Elev./Depth:	8.0'
Sample Location:	INF-3		
Project Specification:	N/A	Client Notes:	N/A
Date Tested:	July 13, 2021	Tested By:	Aaron Clyde

ASTM D6913

Standard Test Method for Particle Distribution of Soil Using Sieve Analysis



Coarse Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
6.00"			
4.00"			
3.00"			
2.50"			
2.00"			
1.75"			
1.50"	100%		
1.25"			
1.00"	96%		
7/8"			
3/4"	93%		
5/8"			
1/2"	91%		
3/8"			
1/4"	85%		

Fine Fraction

US Sieve Size	Percent Passing	Specification Max	Specification Min
#4	81%		
#8	74%		
#10			
#16	61%		
#20			
#30			
#40	13%		
#50			
#60	6%		
#80			
#100	5%		
#140			
#170			
#200	4.5%		
#270			

USCS Classification

D_{10} =	0.349
D_{30} =	0.691
D_{60} =	1.162
C_C =	1.18
C_U =	3.33
Liquid Limit=	
Plastic Limit=	
Plasticity Index=	
Dust Ratio=	0.34
Fineness Modulus	3.65
% Moisture:	
% Gravel	19.1%
% Sand	76.4%
% Silt/Clay	4.5%
USCS Classification	SP, Poorly graded Sand with Gravel

AASHTO ACCREDITED

Notes: N/A

Reviewed By: _____

Krazan

ASTM D2474-20e - Organic Content

July 16, 2021 KA Project No.: 10221014

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Project Information

Project Name:	Proposed Mariners Outlook - Phase III		
Address	Mariners View Drive	City, St., Zip:	Sequim, WA
Jurisdiction	City of Sequim		
Building Permit No.:	N/A		

Sample Information

KA Sample No.:	**Y0159**		
Date Sampled:	July 1, 2021	Sampled By:	Elizabeth Basler
Date Received:	July 7, 2021	Proposed Use:	0
Sample Description:	SP, Poorly graded Sand with Gravel		
Sample Source:	Native, INF-3	Elev./Depth:	8.0'
Project Specification:	N/A	Client Notes:	N/A

ASTM D2974

Standard Test Methods for Determining the Water (Moisture) Content, Ash Content, and Organic Material of Peat and Other Organic Soils

Test Results

Ash Content %	95.6	%
Organic Content %	**4.4**	**%**
As Received Moisture Content %	19.2	%
Furnace Temperature Used	110	F°

All test results are proportion of oven-dried mass.

Reviewed By

SPECTRA Laboratories - Kitsap
...Where experience matters

Spectra Labs - Kitsap, LLC (Poulsbo)
26276 Twelve Trees Ln NW Ste. C
Poulsbo, WA 98370
Phone: (360) 779-5141
www.spectra-lab.com

Spectra Labs - Kitsap, LLC (Poulsbo) received samples from Krazan & Associates, Inc. on Friday, July 9, 2021 at 3:32 pm. Unless otherwise noted, all samples were received in good condition and were tested in accordance with the laboratory's quality control procedures. A summary of the samples received are outlined below.

Sample No.	Description	Location	Sampled
210002-01	Mariners Outlook	INF-1	06/30/2021 17:00
210002-02	Mariners Outlook	INF-2	06/30/2021 17:00
210002-03	Mariners Outlook	INF-3	07/01/2021 15:00

This report package contains laboratory sample results and any attachments listed below. If you have any questions please call (360) 779-5141 or email us at www.spectra-lab.com.

SPECTRA Laboratories ...*Where experience matters*

2221 Ross Way • Tacoma, WA 98421 • (253) 272-4850 • Fax (253) 572-9838 • www.spectra-lab.com

07/21/2021

Spectra Laboratories-Kitsap, LLC
26276 Twelve Trees Lane
Suite C
Poulsbo, WA 98370
Attn: Angela Kaelin

P.O.#: 210002
Project: Mariners Outlook
Sample Matrix: Soil
Date Sampled: 06/30/2021
Date Received: 07/13/2021
Spectra Project: 2021070299
Rush

Client ID	Spectra #	Analyte	Result	Units	Method	Analyzed
INF-1	1	Cation Exchange Capacity	7.78	Na, mEq/ 100g	SW846 9081	07/21/2021
INF-2	2	Cation Exchange Capacity	8.05	Na, mEq/ 100g	SW846 9081	07/21/2021
INF-3	3	Cation Exchange Capacity	13.1	Na, mEq/ 100g	SW846 9081	07/21/2021

SPECTRA LABORATORIES

Marie Holt

Marie Holt, Customer Support & Proj. Manager

a7/scj

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7/21/2021

Spectra Laboratories - Kitsap, LLC
26276 Twelve Trees Lane
Suite C
Poulsbo, WA 98370

Units: Na mEq/100g
Spectra Project: 2021070299
Applies to Spectra #'s 1-3
Analyst: SCJ

QUALITY CONTROL RESULTS

ICP Metals - SW846 9081 - Cation Exchange Extract

Initial Calibration Verfication and Continuing Calibration Verfication/Blank Results

	Standard Value	Conc.	%Rec	QC Limit
ICV	1.0	0.945	94.5	90-110%
CCV	30.0	29.156	97.2	90-110%
CCB	0	0	< 0.045	< 2.2 X MDL

Recovery Limits 90-110%

Certified Reference Material (CRM)

Date Digested: 7/21/2021 Date Analyzed: 7/21/2021

Element	CRM Concentration	CRM Result	CRM %Rec
Sodium	22.4	25.740	114.9

LCS Recovery limits 75-125%

Sample Duplicate Results

Date Digested: 7/21/2021 Date Analyzed: 7/21/2021
Duplicate Sample: 2021070201-2

Element	Replicate 1	Replicate 2	RPD
Sodium	10.100	9.860	2.4

RPD Limit 30
Cation exchange result by calculation

SPECTRA LABORATORIES

SPECTRA Laboratories
...Where experience matters

Turnaround Time Requested
STANDARD ☐ RUSH ☐ SPECIAL ____
Lab Approval Required

CHAIN of CUSTODY

SPECTRA PROJECT # 260002-01

Return Samples Yes ____ No ____

CLIENT: Krazan + Associates ADDRESS: 1230 Finn Hill Road Ste A, Poulsbo, WA ZIP: 98370 ADDRESS CHANGE ☐

PROJECT: Mariners Outlook

CONTACT: Wes Mahan, Vijay Chaudhary

SAMPLED BY: Elizabeth Basler

PHONE: 360-598-2126

e-MAIL: wesmahan@krazan.com, vijaychoudhary@krazan.com

PURCHASE ORDER #: 1022014

	SAMPLE ID	DATE SAMPLED	TIME SAMPLED	MATRIX	NUMBER OF CONTAINERS	HYDROCARBONS: NWTPH-HCID	BTEX	BTEX/NWTPH-G	NWTPH-G	NWTPH-Dx	1664 SGT-HEM (TPH)	1664 HEM (FOG)	ORGANICS: 8260/624 VOA	8260 CHLOR SOLVENTS	8270/625 SEMI VOA	8270 PAH/PNA	8082/608 PCB	METALS: TOTAL METALS RCRA 8	TOTAL METALS (SPECIFY)	TCLP METALS RCRA 8	TCLP METALS (SPECIFY)	OTHER: PH 9040/9045	TX/TOX 9076	TURBIDITY	FLASH POINT	BOD	SOLIDS (SPECIFY)	Fecal Coliform - MPN or MF	GEC
1	INF-1	6/30	5:00 PM		1																								X
2	INF-2	6/30	5:00PM		1																								X
3	INF-3	7/1	3:00 PM		1																								X
4																													
5																													
6																													
7																													
8																													
9																													
0																													

SPECIAL INSTRUCTIONS/COMMENTS:

Sample Receipt (lab use only)		SIGNATURE	PRINTED NAME	COMPANY	DATE	TIME
Total # of containers ____	RELINQUISHED BY		Elizabeth Basler	Krazan	7/9/21	5:32
COC seals present? ____ Intact? ____	RECEIVED BY			Spectra	7/9/21	1532
Temp at receipt ____ deg. C.	RELINQUISHED BY					
Received within hold time? ____	RECEIVED BY					
Proper sample containers? ____	RELINQUISHED BY					
Received via ____ Cooler? ____	RECEIVED BY					

Payment Terms: Net 30 days. Past due accounts subject to 1 1/2 % per month interest. Customer agrees to pay all costs of collection including reasonable attorney's fees and all other costs of collection regardless of whether suit is filed in Pierce Co., WA venue.

APPENDIX B

EARTHWORK SPECIFICATIONS

GENERAL

When the text of the report conflicts with the general specifications in this appendix, the recommendations in the report have precedence.

SCOPE OF WORK: These specifications and applicable plans pertain to and include all earthwork associated with the site rough grading, including but not limited to the furnishing of all labor, tools, and equipment necessary for site clearing and grubbing, stripping, preparation of foundation materials for receiving fill, excavation, processing, placement and compaction of fill and backfill materials to the lines and grades shown on the project grading plans, and disposal of excess materials.

PERFORMANCE: The Contractor shall be responsible for the satisfactory completion of all earthwork in accordance with the project plans and specifications. This work shall be inspected and tested by a representative of Krazan and Associates, Inc., hereinafter known as the Geotechnical Engineer and/or Testing Agency. Attainment of design grades when achieved shall be certified to by the project Civil Engineer. Both the Geotechnical Engineer and Civil Engineer are the Owner's representatives. If the contractor should fail to meet the technical or design requirements embodied in this document and on the applicable plans, he shall make the necessary readjustments until all work is deemed satisfactory as determined by both the Geotechnical Engineer and Civil Engineer. No deviation from these specifications shall be made except upon written approval of the Geotechnical Engineer, Civil Engineer or project Architect.

No earthwork shall be performed without the physical presence or approval of the Geotechnical Engineer. The Contractor shall notify the Geotechnical Engineer at least 2 working days prior to the commencement of any aspect of the site earthwork.

The Contractor agrees that he shall assume sole and complete responsibility for job site conditions during the course of construction of this project, including safety of all persons and property; that this requirement shall apply continuously and not be limited to normal working hours; and that the Contractor shall defend, indemnify and hold the Owner and the Engineers harmless from any and all liability, real or alleged, in connection with the performance of work on this project, except for liability arising from the sole negligence of the Owner of the Engineers.

TECHNICAL REQUIREMENTS: All compacted materials shall be densified to a density not less than 95 percent of maximum dry density as determined by ASTM Test Method D1557 as specified in the technical portion of the Geotechnical Engineering Report. The results of these tests and compliance with these specifications shall be the basis upon which satisfactory completion of work will be judged the Geotechnical Engineer.

SOIL AND FOUNDATION CONDITIONS: The Contractor is presumed to have visited the site and to have familiarized himself with existing site conditions and the contents of the data presented in the soil report.

The Contractor shall make his own interpretation of the data contained in said report, and the Contractor shall not be relieved of liability under the contractor for any loss sustained as a result of any variance between conditions indicated by or deduced from said report and the actual conditions encountered during the progress of the work.

DUST CONTROL: The work includes dust control as required for the alleviation or prevention of any dust nuisance on or about the site or the borrow area, or off-site if caused by the Contractor's operation

either during the performance of the earthwork or resulting from the conditions in which the Contractor leaves the site. The Contractor shall assume all liability, including Court costs of codefendants, for all claims related to dust or windblown materials attributable to his work.

SITE PREPARATION:

Site preparation shall consist of site clearing and grabbing and preparations of foundation materials for receiving fill.

CLEARING AND GRUBBING: The Contractor shall accept the site in this present condition and shall demolish and/or remove from the area of designated project earthwork all structures, both surface and subsurface, trees, brush, roots, debris, organic matter, and all other matter determined by the Geotechnical Engineer to be deleterious. Such materials shall become the property of the Contractor and shall be removed from the site.

Tree root systems in proposed building areas should be removed to a minimum depth of 3 feet and to such an extent which would permit removal of all roots larger than 1 inch. Tree root removed in parking areas may be limited to the upper 1½ feet of the ground surface. Backfill or tree root excavation should not be permitted until all exposed surfaces have been inspected and the Geotechnical Engineer is present for the proper control of backfill placement and compaction. Burning in areas, which are to receive fill materials, shall not be permitted.

SUBGRADE PREPARATION: Subgrade should be prepared as described in our site preparation section of this report.

EXCAVATION: All excavation shall be accomplished to the tolerance normally defined by the Civil Engineer as shown on the project grading plans. All over excavation below the grades specified shall be backfilled at the Contractor's expense and shall be compacted in accordance with the applicable technical requirements.

FILL AND BACKFILL MATERIAL: No material shall be moved or compacted without the presence of the Geotechnical Engineer. Material from the required site excavation may be utilized for construction site fills provided prior approval is given by the Geotechnical Engineer. All materials utilized for constructing site fills shall be free from vegetable or other deleterious matter as determined by the Geotechnical Engineer.

PLACEMENT, SPREADING AND COMPACTION: The placement and spreading of approved fill materials and the processing and compaction of approved fill and native materials shall be the responsibility of the Contractor. However, compaction of fill materials by flooding, ponding, or jetting shall not be permitted unless specifically approved by local code, as well as the Geotechnical Engineer.

Both cut and fill shall be surface compacted to the satisfaction of the Geotechnical Engineer prior to final acceptance.

SEASONAL LIMITS: No fill material shall be placed, spread, or rolled while it is frozen or thawing or during unfavorable wet weather conditions. When the work is interrupted by heavy rains, fill operations shall not be resumed until the Geotechnical Engineer indicates that the moisture content and density of previously placed fill are as specified.

APPENDIX C

PAVEMENT SPECIFICATIONS

1. DEFINITIONS – The term "pavement" shall include asphalt concrete surfacing, untreated aggregate base, and aggregate subbase. The term "subgrade" is that portion of the area on which surfacing, base, or subbase is to be placed.

2. SCOPE OF WORK – This portion of the work shall include all labor, materials, tools and equipment necessary for and reasonable incidental to the completion of the pavement shown on the plans and as herein specified, except work specifically noted as "Work Not Included."

3. PREPARATION OF THE SUBGRADE – The Contractor shall prepare the surface of the various subgrades receiving subsequent pavement courses to the lines, grades, and dimensions given on the plans and as per the pavement design section of this report. The upper 12 inches of the soil subgrade beneath the pavement section shall be compacted to a minimum compaction of 95% of maximum dry density as determined by test method ASTM D1557. The finished subgrades shall be tested and approved by the Geotechnical Engineer prior to the placement of additional pavement of additional pavement courses.

4. AGGREGATE BASE – The aggregate base shall be spread and compacted on the prepared subgrade in conformity with the lines, grades, and dimensions shown on the plans. The aggregate base should conform to WSDOT Standard Specification for Crushed Surfacing Base Course or Top Course (Item 9-03.9(3)). The base material shall be compacted to a minimum compaction of 95% as determined by ASTM D1557. Each layer of subbase shall be tested and approved by the Geotechnical Engineer prior to the placement of successive layers.

5. ASPHALTIC CONCRETE SURFACING – Asphaltic concrete surfacing shall consist of a mixture of mineral aggregate and paving grade asphalt, mixed at central mixing plant and spread and compacted on a prepared base in conformity with the lines, grades, and dimensions shown on the plans. The drying, proportioning, and mixing of the materials shall conform to WSDOT Specifications.

The prime coat, spreading and compacting equipment, and spreading and compacting the mixture shall conform to WSDOT Specifications, with the exception that no surface course shall be placed when the atmospheric temperature is below 50 degrees F. The surfacing shall be rolled with combination steel-wheel and pneumatic rollers, as described in WSDOT Specifications. The surface course shall be placed with an approved self-propelled mechanical spreading and finishing machine.

6. TACK COAT – The tack (mixing type asphaltic emulsion) shall conform to and be applied in accordance with the requirements of WSDOT Specifications.